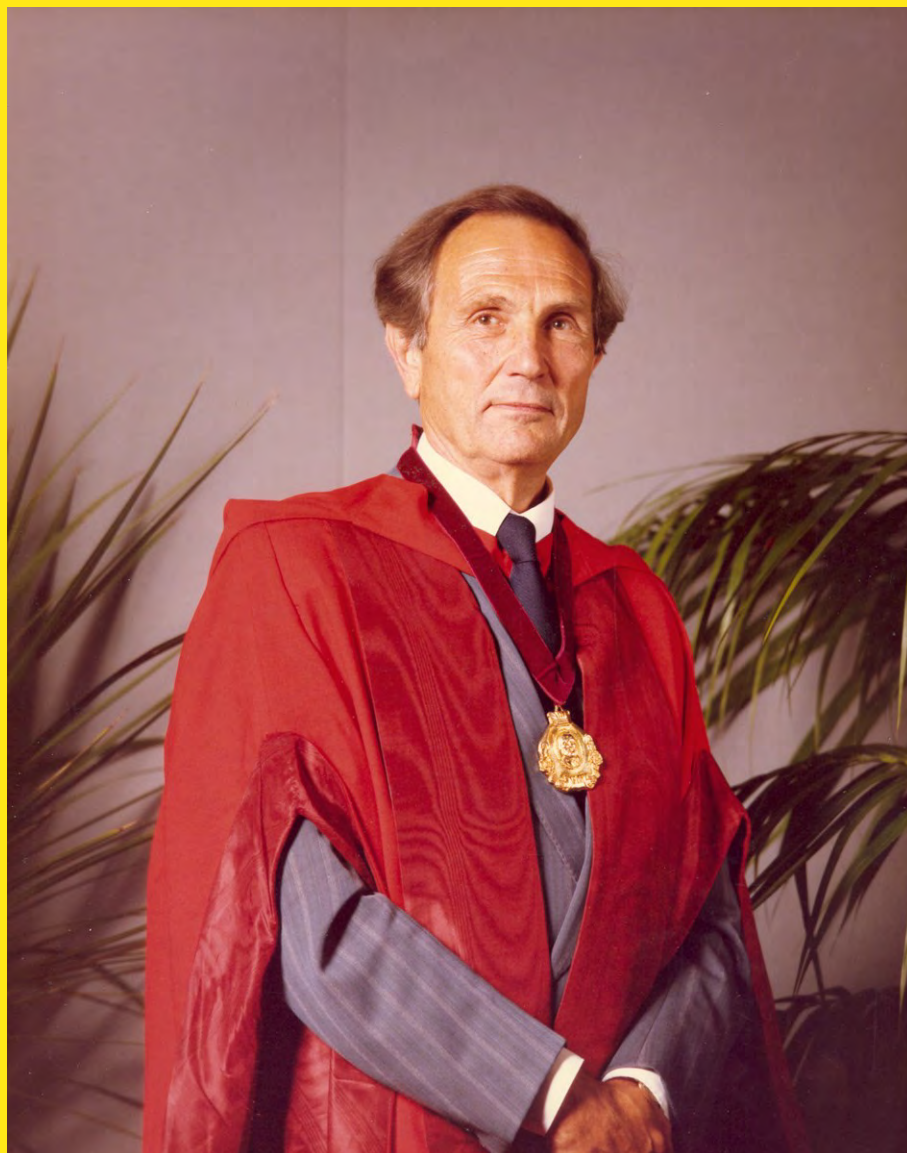


Dental Historian

Volume 70 (2)

July 2025



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The Dental Historian

The Dental Historian is an international journal which publishes peer reviewed papers of historical interest, relevant biographies and descriptions of historical artefacts. The Dental Historian is the official journal of the Lindsay Society for The History of Dentistry.



The Lindsay Society for the History of Dentistry

The Lindsay Society is one of the largest societies in the world dedicated to the history of dentistry. Founded in 1962, the society takes its name from Lilian Lindsay (1871–1960), who in 1895 became the first woman to qualify as a dentist in the United Kingdom. She went on to become an internationally renowned dental historian and instigated both the Museum and the Library of the British Dental Association.

The aims of the Society are to promote interest, study and research into the history of dentistry and to bring together members of the dental profession and like-minded individuals who share these interests. The Society holds 2 formal meetings a year, an annual lecture in London with a distinguished academic speaker and a weekend conference in various locations around the UK, and an online President's meeting.

The Dental Historian is sent free to members of the Lindsay Society. News updates and other information are available at www.lindsaysociety.co.uk.

Submissions to the Dental Historian

Submissions to the Dental Historian are invited on topics of relevance to the worldwide history of dentistry. Letters, short items of news of historical interest and notes of serendipitous research findings are welcomed.

Please send submissions to editor@lindsaysociety.co.uk.

Detailed author instructions may be found on page 116.

Cover photograph

This edition's cover image is of Professor Sir Paul Bramley FRCS FDS RCS (1923-2020). Knighted for services to dentistry in 1984, he was Professor of Dental Surgery at the University of Sheffield from 1969-88, and Dean of the School of Clinical Dentistry from 1972-75.

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The Lindsay Society

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Membership is open to anyone interested in the history of dentistry. Membership applications should be sent to the Honorary Secretary, Dr Brian Williams, 14 Howard Road, Great Bookham, Surrey KT23 4PW, email secretary@lindsayssociety.co.uk or join online.

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UK member	£33.00
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Lindsay Society news

The 2025 Annual Conference

The dates should already be in your diaries or electronic devices but just to remind you - this year's weekend conference will take place between Friday 3rd – Sunday 5th October at the Woodland Grange Hotel and Conference Centre, just outside Royal Leamington Spa. Set in 6 acres of gardens, the hotel also offers a gym and a games room.

Transport connections to Leamington Spa are excellent, being only 1hr 15mins by rail from London Marylebone Station or 30 minutes away by taxi from Birmingham Airport. If travelling by car, the hotel is close to junction 14 on the M40 and there are plenty of parking places in the hotel's extensive grounds.

As in previous years the weekend starts with an informal buffet supper on the Friday evening with lectures following on both the Saturday and Sunday mornings. As ever the talks, with an international panel of speakers will be an eclectic mix of science, art and humour – so something for everyone!

Saturday afternoon takes us away from Woodland Grange to view and tour the Lord Leycester Hospital (not a hospital now!) but one of the best examples of medieval architecture in the country. Very interesting buildings and grounds and full of history. A visit not to be missed.

Saturday evening is the time to show off the bling and bow-ties at the Conference Dinner. This time, for the first time, it will be held at our conference centre and not elsewhere as has been the case in the past – so it promises to be something quite special.

The Conference programme and registration form will be sent out in early July; so, check your junk mail if it doesn't arrive. I'd hate you to miss the 'weekend of the year' by default!

For your information, Royal Leamington Spa is renowned for its Regency Pump Rooms elegant vistas, boutique shops, museum and art gallery as well as the famous Jephson Gardens. So why not stay awhile after the Conference to explore the area and with Warwick just 3 miles away, there is much to see.

Brian Williams: Hon Secretary Lindsay Society



30th Lilian Lindsay Memorial Lecture – one to dig into...

“Teeth and Archaeology” was the title of the lecture held on 1st May, 2025 at the Institute of Physics close by King’s Cross railway station.

In her introduction, Helen Nield, the current President of the Lindsay Society said that she was sure Lilian Lindsay would have been eagerly awaiting the talk having experienced, as she wrote to a fellow dentist, “the excitement of excavating a Neolithic tomb in Kent in the year 1910.” This was the Coldrum Long Barrow near West Malling.

Don Walker, a senior human osteologist at MOLA (Museum of London Archaeology), gave a superbly photographed presentation highlighting the findings, predominantly from the HS2 and Spitalfields excavation sites. Many pathological features were illustrated including jaw fractures, extensive bone destruction due to apical infections and cysts as well as tooth wear and caries. Some teeth appear to have been repaired with a filling material while dentures of varying designs and materials tended to be excavated from the wealthier burial plots.



Making history

The grant of arms to the College of General Dentistry

Sir Nairn Wilson CBE

The granting of arms is a formal recognition bestowed by the official heraldic authority, the College of Arms, and symbolises legitimacy and identity of an organisation or individual. Dating back centuries, Arms are typically granted to those which meet established criteria of permanence, achievement, and contribution to their respective fields.

The process involves the design of an armorial achievement, which includes various heraldic elements such as a shield, crest, and motto, each imbued with symbolic meaning. These elements collectively encapsulate the ethos and aspirations of the organisation.

The College of General Dentistry (intended Royal College of General Dentistry) has been honoured by the granting of such arms. The Letters Patent were presented to Sir Nairn Wilson, Honorary Founding President of the College, accompanied by Dr Simon Thornton-Wood, Chief Executive of the College, at the College of Arms on Monday 19th May 2025 (Figure 1).



Figure 1 Sir Nairn Wilson accepting the Letters Patent at the College of Arms.

The text of the Letters Patent reads as follows

“TO ALL AND SINGULAR to whom these Presents shall come David Vines White Esquire Garter Principal King of Arms Timothy Hugh Stewart Duke Esquire Clarenceux King of Arms and Robert John Baptist Noel Esquire Norroy and Ulster King of Arms Send Greeting! Whereas Michael Anthony Horton Chair of Trustees of The College of General Dentistry and Sir Nairn Hutchinson Fulton Wilson Knight, Commander of the Most Excellent Order of The British Empire Honorary Founding President of The College of General Dentistry have represented unto The Most Noble Edward William Duke of Norfolk Knight Grand Cross of the Royal Victorian Order Earl Marshal and Hereditary Marshal of England that The College of General Dental Practitioners of the United Kingdom was duly incorporated by that name as a private company limited by guarantee without share capital on the Twenty-eighth day of February 1991 under the Companies Act 1985 and registered as a charity in England and Wales on the Third day of May following That by resolution made the Fourteenth day of March 2014 the name of the said Company was changed to The College of Dentistry That by further resolution made the Twelfth day of March 2018 the name of the said Company was again changed to The College of General Dentistry That the objects of the said Company are the promotion and encouragement of the study and practice of the art and science of dental surgery including in particular but without limitation general dental practice ancillary to such general dental surgery And that the governance of the said Company is vested in a Board of Trustees which Board is desirous of having Armorial Ensigns established for The College of General Dentistry under lawful authority and duly recorded in His Majesty's College of Arms And whereas they the said Michael Anthony Horton and Sir Nairn Hutchinson Fulton Wilson as Chair of Trustees and Honorary Founding President respectively and on behalf of the said Board of Trustees have requested therefore the favour of His Grace's Warrant for Our granting and assigning such Arms and Crest and in the same Patent such Device or Badge as We deem suitable to be borne and used by The College of General Dentistry on its Common Seal or

otherwise according to the Laws of Arms And forasmuch as the said Earl Marshal did by Warrant under his hand and Seal bearing date the Fifth day of July 2024 authorize and direct Us to grant and assign such Arms and Crest and in the same Patent such Device or Badge accordingly Know Ye therefore that We the said Garter Clarenceux and Norroy and Ulster in pursuance of His Grace's Warrant and by virtue of the Letters Patent of Our several Offices granted by Her late Majesty to each of Us respectively do by these Presents grant and assign unto The College of General Dentistry the Arms following that is to say: Azure a Pelican in her piety Or vulning herself Gules on a Chief Or three Serpents nowed Azure And for the Crest Upon a Helm with a Wreath Or and Azure A demi Opivicus wings elevated and addorsed Azure armed Or resting the dexter paw on a Pearl proper Mantled Azure doubled Or as are in the margin hereof more plainly depicted And by the Authority aforesaid We do further grant and assign the following Device or Badge that is to say: An Opivicus rampant wings elevated and addorsed Azure armed Or holding between the forepaws a Pearl proper as herein depicted the whole to be borne and used for ever hereafter by The College of General Dentistry on Seals or otherwise according to the Laws of Arms In witness whereof We the said Garter Clarenceux and Norroy and Ulster have to these Presents subscribed Our names and affixed the Seals of Our several Offices this fourth day of March in the Third year of the Reign of Our Sovereign Lord Charles the Third by the Grace of God of the United Kingdom of Great Britain and Northern Ireland and of His other Realms and Territories King Head of the Commonwealth Defender of the Faith and in the year of Our Lord Two thousand and twenty-five."

The Armorial Achievement

The armorial achievement, as described and presented in the Letters Patent, is illustrated in Figure 2.



Figure 2 The armorial achievement of the College of General Dentistry

The plain English description of the achievement is as follows:

The shield - the centrepiece of the armorial achievement, has a blue background (field). The central feature of the shield is a golden pelican 'in her piety' – feeding a brood of three chicks in a nest, with the chicks pecking and wounding their mother's breast, anxious to be fed. The principal meaning evoked by the pelican is caring, first and foremost, for patients, secondly for early career oral healthcare professionals and students, and thirdly for the moral compass of the profession – hence the three chicks. The pelican is surmounted by a golden band ('chief') displaying three snakes, each knotted ('nowy'). The knotted snakes symbolise unity within the profession, unity with other health professions and unity of purpose in healthcare, emphasising the importance of oral health to general health and wellbeing. Together the pelican and snakes symbolise trust and reliance. The crest on top of the helm features the upper half of an opinicus, resting its dexter foreleg on a giant pearl. The traditional opinicus, derived from the original crest of the Company of Barber Surgeons, incorporated in 1462, is a symbol of influence, and strength in diversity and inclusivity within the College. The pearl signifies wisdom in the art and science of dentistry. The Opinicus, rarely included in heraldic achievements, resembles a dragon in the forepart and in the wings, with a beaked head and ears similar to those of a griffin. The hind part and the legs resemble those of a lion. The tail is similar to that of a bear. The mantling around the shield and helm displays the livery colours of the College –azure blue and gold. Below the shield sits the College motto: Sanitate oris venit fortitude – through oral health strength – strength for patients; strength for the profession.

Badge

The badge of the College (Figure 3) is a proud and bold opinicus in College blue and rampant posture (standing on one hind foot in profile, with raised wings and tail), holding the giant pearl of wisdom, featured in the crest of the arms, between its clawed forepaws

Significance

The granting of arms adds to the legitimacy of the College, which is now firmly part of the healthcare establishment. The College will be taking prompt action to apply its arms and badge in, for example, a re-design of diploma certificates and the introduction of college regalia. While not a requirement, the granting of arms is considered to be an important step towards the College being considered eligible for the granting of a Royal Charter - a priority for the College in its further growth and development. The College is the ninth dental organisation in the UK, Australia and New Zealand to have granted arms.¹



Figure 3 The badge of the College of General Dentistry

Reference

¹ Wilson, N.H.F. Heraldry in dentistry. Dental Historian (2023);68:53-62.

Author

Emeritus Professor of Dentistry and Founding President Emeritus of the College of General Dentistry. Sir Nairn's many different positions have included Editor of the Journal of Dentistry, Dean of the University Dental Hospital of Manchester, King's College London Dental Institute and the Faculty of Dental Surgery, Royal College of Surgeons of Edinburgh and President of the General Dental Council and British Dental Association

Editorial

Blue Plaques can be seen on houses across the country, commemorating the residences of the famous. In London the scheme is managed by English Heritage and a current search of the database shows 3 dentists recognised with a Blue Plaque. They are James Robinson (1813-1862) at 14, Gower Street, WC1E 6DP – ‘a pioneer of anaesthesia and dentistry,’ Sir Edwin Saunders (1814-1901), at 89, Wimbledon Parkside, SW19 5LR – ‘dentist to Queen Victoria,’ and Lilian Lindsay (1871-1960) at 23, Russell Square, WC1H – ‘the first woman dentist to qualify in Britain.’



As I was reflecting on this slightly eclectic mix of individuals, it struck me that they represent – probably coincidentally – 3 distinct areas of dentistry, which come together to make dentistry the profession that it is. Robinson, the anaesthetic pioneer, the author of textbooks, papers on the filling of teeth and recipient of an honorary DDS from Baltimore, USA, reminds us of the research and development essential to an evidence-based profession. Saunders, who published little but such was his clinical prowess that he was appointed dental surgeon to the Queen, reminds us that dentists are clinicians who operate on, or interact with, patients for their benefit and healing.

Lindsay reminds us of something slightly different - the ‘humanity’ of dentistry. Dentists are not only clinical operators or scientific researchers. In their interactions, they need a deeper understanding of people - which can only come from the humanities. The relationship between the science of dentistry and the humanities is symbiotic. While scientific advancements propel the profession forward, the humanities – art, literature, history - ensure that it remains compassionate and patient-centred. Literature, for instance gives a greater understanding of different cultures and generations. Philosophy provides a framework for ethical decision making. History is not only an inventory of the past but encourages critical thinking and brings ‘accumulated experience to bear on current problems’ and reminds us ‘of missed opportunities and paths not taken.’¹ Together, the sciences, the clinical skills and the humanities form the foundation of a holistic approach to dental care.

Lilian Lindsay, a distinguished practitioner in her own right, recognised the importance of history in particular and realised that libraries and museums are repositories of that humanity. She was not alone. Andrew Carnegie, the American industrialist and philanthropist, wrote that ‘A library outranks any other one thing a community can do to benefit its people. It is a never-failing spring in the desert.’ The Museums Association describes museums as places which ‘help us feel proud of where we have come from, and inspire, challenge and stimulate us.’ In dental terms, a museum and a library take us out of the mouth, to help us see the bigger context from whence we have come, help us understand the present and guide our

future direction. In the words of a previous editor of the BDJ 'Without some sense of where we have come from I believe it is more difficult to chart where we might next go.'² The humanities, and in particular, libraries and museums, give a whole new meaning to the phrase 'open wide.'

The British Dental Association is the custodian of Lilian Lindsay's vision for a dental library and museum and hosts it within its central London headquarters. The Association's website proudly proclaims that it houses 'The most comprehensive dental library in Europe' and the museum 'the largest collection of dental heritage in Europe' - worldwide equalled only by the National Museum of Dentistry in Baltimore, USA. However, after 3 years of deliberating on 2 options to save money - to sublet part of the building or to downsize and redevelop, both of which were refused by the landlord - the BDA decided to leave its premises at 64, Wimpole Street, *with no ongoing plan to re-house either the museum or the library*. Everything – from books and journals to catalogues and pamphlets, Victorian portraits and dental chairs to practice records and toothbrushes – is being placed in storage. The library will become 'remote' only and the museum contents will remain in storage while a decision is made about its future. While the crating and packing continues at pace in Wimpole Street (see page 117) but the decision making process moves on seemingly much more slowly, the Chairman of the Board promises that he (and the Board) 'won't leave the museum and library in storage.'

As members of the Lilian Lindsay Society, we have to hope that they can keep that promise because in choosing to prune the museum and the library from its current offering to members, even temporarily, with no plans for permanent physical spaces for research or examination of documents and artefacts, the BDA risks being remembered for an act of cultural vandalism. In their quest for financial stability, they have apparently misunderstood the continuing importance of the humanities to dentistry. In this, if the museum and library are not re-opened soon, the Association will have diminished itself and disrespected the memory of those who, like Lilian Lindsay, recognised the importance of a museum and library as springs of wisdom and guides to the future direction of the profession.

¹ Tosh, J Why history matters (2008) Palgrave MacMillan, Hampshire, UK

² Hancocks, S Editorial BDJ (2019) 227; 433

This edition of the Dental Historian again illustrates the wide range of topics covered by a study of history - from the archaeology of teeth and calculus, through Victorian preventive dentistry and early dental advertisements, to some important reflections on dental education in the 20th century. In addition, you will find letters to the editor, a book review and summaries of papers of historical interest from other journals. I commend the edition to you and look forward to hearing any comments or suggestions for improvements or new features.

In the next edition, on the 20th anniversary of the 'new' NHS contract in 2006, I am hoping to present some papers which reflect on the changes in dentistry in the early 'noughties' - 2000 to 2008. Please get in touch if wish to contribute to the discussion.

Letters

Royal Dental Hospital Reunion

Sir

The Royal Dental Hospital of London (RDH) was the oldest dental school and hospital in Europe which closed in 1985. I am attempting to contact alumni to commemorate the 40th anniversary of RDH's cessation.

After speaking to several others, I have reserved the sixth floor of the Radisson Blu Hotel (formerly the Hampshire Hotel) in Leicester Square, the site of The Royal, for a special luncheon on Saturday, 11th October 2025, at midday.

The event will begin with a welcome drink, followed by a three-course meal. The cost per person will be £90. Partners are also welcome.

If any readers are interested in attending, please email me at jerryecasquith@btinternet.com. As the database is a little outdated, I would appreciate it if you could forward this invitation to anyone else who may be interested.

I very much hope that many can join me, and I look forward to sharing stories and reminiscing about our old university!

Jerry Asquith (1977-81)

Piltdown Man and a connection to the Sussex Archaeological Society

Sir

I write to express my appreciation for the superb articles by Christopher Dean (Dental Historian 2025 70(1):8-25) about Arthur Swayne Underwood and to add a little local background to the subject.

I have lived in Lewes, the ancient County Town of Sussex, for 60 years and have been much involved with its local history. Since 1845, and up to the Beeching report of 1963, there were superb railway links to surrounding towns and villages before motor transport had significantly developed. In an hour or so, you could reach Hastings, Chichester or London (via Haywards Heath or Uckfield) by steam train! Lewes is still the administrative centre for East Sussex with County Hall, law courts of various sorts and a prison, and as a meeting place with markets and businesses. The Sussex Archaeological Society (SAS) (these days it would be named 'historical' society, reputed the oldest in Britain) is still centred in Barbican House, part of the old Norman castle, on Lewes High Street. The SAS has a list of Vice-Presidents that reads like the Who's Who of Sussex, with a marquess and a duke, as well as Rudyard Kipling.

Sir Arthur Smith Woodward, LL.D., F.R.S. of Hill Place, Haywards Heath was a member of the SAS, joining in 1924. Haywards Heath is a few miles north of Lewes and on one of the railway lines up to town, a commuters' route for him to reach the British Museum (Natural History). In 1925, the Collections of the SAS record that he read a paper at their autumn meeting entitled 'Some problems of Piltdown', some time after the death of Charles Dawson in 1916. Woodward clearly had doubts long before the debunking of 1953 when the wide discrepancies of levels of fluorine could be measured.

Charles Dawson Esq., FGS FSA(G) (for geological) of Uckfield (next to Piltdown village) is listed as a member of the SAS from 1892. This puts him in a position to influence it's members with his views. Dating fossils through their geological context was a new science which could not call upon the technology of today and relied on comparative anatomy and morphology. He may have known of Dr Gideon Algernon Mantell, MRCS FRS who, with the help of his wife Mary, first discovered the fossilised teeth, then skeleton, of a giant reptile near Uckfield in 1822. It resembled the modern iguana reptile skeletons in the Royal College of Surgeons museum, so he called it iguanadon (i.e. with teeth.) He later sold his extensive fossil collection to the British Museum.

By pure coincidence this month, our local newspaper, Sussex Express, published an article (in copyright) by David Arnold on the Piltdown hoax. A photograph shows Dawson dressed in breeches and wearing a ceremonial sword, attire suitable for a High Sheriff, who are appointed in Lewes. I cannot find his name in the Roles of that office but he may have been a Deputy Sheriff. The article showed that Dawson was capable of acute historical observations, here in relation to the Bayeux tapestry and the Battle of Hastings, which recent research and scholarship have found to be correct! He also wrote and published a very comprehensive history of Hastings Castle.

With hindsight, we now know that the Piltdown human skull fragments are of an age when Homo Sapiens was well established and that our hominid precursors were already extinct. The Piltdown human remains cannot support the theory of a missing link, which apparently had to be an Englishman!

It is of paramount importance that history and archaeology are interpreted in their context, including social, for us to have a rounded and comprehensive understanding. Christopher Dean's article beautifully shows up the differences in interpretations, and expectations made a century ago and the present.

I trust that this supplements the interest of the members of the Lindsay Society

Yours sincerely,

Tom Sholl

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A dental connection to 1930s political activism

Sir

Prompted by seeing the musical *Cable Street*, I write to share my personal dental family connection to the clashes between Oswald Mosley's Blackshirts and the anti-fascist movement, in the East End of London in 1936, events which are commemorated on a large mural in Cable Street itself.

In the 1930s, Europe was undergoing much political change as a result of the First World War, after which Germany, Italy and the Soviet Union were ruled by the fascist dictators Hitler, Mussolini and Stalin. Most countries were also in the depths of an economic depression. England was also affected by the political atmosphere and one of the Labour party's brightest hopes, Sir Oswald Mosley, left the Party to found and lead the British Union of Fascists (BUF) in 1932. Furthermore, he publicly espoused antisemitism, leading to fights whenever he spoke, guarded by his uniformed Blackshirts.

The outbreak of the Spanish Civil war in July 1936 was an event that polarised Europe. The Nationalists under General Francisco Franco received support from Germany and Italy, while the Republicans under Francisco Largo Caballero and, later, Juan Negrín received support from the Soviet Union. Britain and most of Europe remained neutral despite being aware of active German support in the war effort. However, many individuals from around the world, particularly members affiliated to the Communist and Socialist Parties, became active fighting volunteers in groups such as the International Brigade. Indeed, I am named (Barry Kenneth Bradbury Berkovitz) after an Oldham volunteer in the International Brigade, Kenneth Bradbury, who was killed aged 18 years of age, defending Teruel, in 1938.

With the British Government aiming to stay neutral, the main British political party at the time in support of the Republicans in Spain was the Communist Party, with its Central Committee Headquarters in London. In 1936, following the party line from Moscow's Headquarters, the Communist Party set in motion plans for a 'Save Spain' Rally in Trafalgar Square on October 4th. A fortnight before the event, Mosley suddenly announced the date of his own march of uniformed fascist Blackshirts through Stepney, East London and his aim to hold four separate meetings there. This date was October 4th – the very same day as the Communist's rally in Trafalgar Square.

Desperate efforts were made through local authorities, the churches, the Home Office and other official channels to make the police ban Mosley's march altogether or force him to change his route. All to no avail. On the Monday before the date set for the march, the ten-strong committee of the Stepney branch (St George's Cell) of the Communist Party, of which my father was a member, held their regular weekly meeting at the 'Popular Café' in Manningtree Street near Gardiner's Corner in the East End. The chairman of the committee was Joe Jacobs, just 23 years of age, who became one of my father's closest friends until his death in 1977 aged 64. He was a burly character, well capable of looking after himself and easily identifiable due to a removable glass eye resulting from a childhood eye infection. The members argued till midnight and finally agreed that they would have to stand firm in Stepney and resist Mosley by force, if necessary. Joe was delegated to present the case the following day to the London District Party Committee of the Communist Party at the Centre in King Street. His brief was to press for a change of venue, to switch from Trafalgar Square to a rally in Stepney instead. If this did not happen, Joe felt the Communist Party would be finished in Stepney.

Joe visited the Headquarters in King Street and presented the request for a change from the rally in Trafalgar Square to attempt to stop Mosley's March. However, the answer from the Centre was still 'No'. The Rally in Trafalgar Square stood. Not only that, but the Central Committee also instructed that the rally would be kept orderly, peaceful and under control and that clashes with the fascists were to be avoided.

When Joe reported the outcome back to the Stepney branch, they were adamant that Mosley had to be stopped and that if the Central Committee didn't back them and change the Trafalgar Square date, they would act independently. Such defiance of the highest authority was unheard of in Party annals. It was an agonising decision for Joe and the other members of the Stepney branch to make as they prided themselves on discipline being their real strength. But it worked. Joe got his way and returned at midnight with the news that the Central Committee had agreed to their demands. They had not fully appreciated the deep feelings aroused in the East End by the proposed march. They would cancel the Trafalgar Square Rally and support the 'Stop Mosley' call.

The rest is history. The different populations of the East End came together, especially the Jews, Communists, Labour Party members, residents, and Irish Dockers. The streets were barricaded. About a quarter of a million demonstrators showed up around Gardiner's Corner and choked every possible line of Mosley's march. The police tried to remove the barricades from Cable Street but were unsuccessful and numerous fights ensued. The battle cry of the anti-fascist forces in Spain, *No Pasarán* (They shall not pass), was daubed on the streets and shouted by the crowds. Following further violence, the Chief Police Commissioner himself, Sir Philip Game, eventually told a hemmed in Mosley he couldn't proceed, and the fascist march was abandoned. The events of that day were incorporated in the phrase "the battle of Cable Street".¹⁻³ The British Union of Fascists never recovered from this setback. In May 1940, after the outbreak of the Second World War, Mosley was imprisoned and the BUF banned.

In 1976, forty years after the Cable Street resistance, Dan Jones, secretary of the Tower Hamlets Trades Council felt the event important enough in the local history of Stepney to commemorate it and invited an artist, Dave Binnington, to paint a large Mural in Cable Street. Funding was obtained from a number of sources, including the Greater London Arts Association, the Gulbenkian Foundation and the Royal Academy. The site chosen for the Mural was the side of St George's Town Hall and work commenced in 1979. Binnington soon recruited another artist, Paul Butler to help with the Mural. Work proceeded slowly and was still unfinished when, on 23rd May 1982, the Mural was vandalised, after which Binnington abandoned his role in the project.

Work on the Mural by Paul Butler restarted in July 1982 and he recruited two additional artists, Ray Walker and Desmond Rochfort. The Mural was unveiled on 7th May 1983 and covers about 65 × 50 feet (20 × 15 m) (Figure 1).

During the painting of the Mural, my father was introduced to the artists and, as someone with an inside seat on this important event as a committee member of the Stepney Communist party, he was able to provide them with an authoritative and detailed account of the battle and its background. As a thank you for his help, the artists included two hidden references to my father in the Mural itself. I am advised that the figure between Hitler's legs in the cap and white overalls is a representation of my father. More directly, immediately above Hitler's right toe is a street name 'erkowitz' (Figure 2). This, clearly, is another way of memorialising my father and his presence at the event. To add some mystery, the first initial, 'B', is tantalisingly hidden, and also the 'v' is replaced with a 'w', a common error that I have patiently had to put up with all my career.

Although this 'erkowitz' sign will be meaningless to all but a handful of people (Figure 3), readers of this letter should now expand this number and appreciate the dental connection.

Dr Barry Kenneth Bradbury Berkovitz

Emeritus Reader, Dental Anatomy, King's College London.

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- ¹ Berkovitz, S. Blumenthal, S. 2019. The Good Soldier Sam: Memoirs of an East End Everyman. Amazon. pp 83-87.
- ² Jacobs, J. 1978. Out of the ghetto. J.Simon. pp235-258.
- ³ Cable Street Mural. https://en.wikipedia.org/wiki/Cable_Street_Mural



Figure 1 The Cable Street mural



Figure 2 Detail of Cable Street mural showing the name "erkowitz" and a man in a cap and white overall.



Figure 3 Dr Saul Berkovitz (son of Dr Barry KB Berkovitz) standing in front of a portion of the Cable Street Mural in 2025.

Delving into history: how the latest advances in dental analysis can unlock the secrets of the past

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Abstract

The study of ancient teeth offers many opportunities for exploring human activity in earlier periods, primarily due to their exceptional preservation and unique ability to capture diverse biological markers. Unlike other parts of the skeleton, teeth resist postmortem decay, making them reliable repositories of biological data that provide insights into physiology, diet, health, and genetics. This review examines key advances in dental analysis, focusing on cutting-edge bioarchaeological methods for studying both recent and ancient teeth. Topics covered include climate change, stable isotope analysis for reconstructing diets and migration patterns, and the investigation of ancient diseases and medical practices. Advanced techniques, including ancient DNA (aDNA) analysis and proteomic studies of teeth and dental calculus, further expand our understanding by identifying genetic and protein markers linked to health and disease. Collectively, these approaches bridge critical gaps in our knowledge of human history and biology, offering a more comprehensive view of how ancient populations adapted to their environments, managed health challenges, and sustained their ways of life.

Keywords: dental analysis, stable isotopes, aDNA, dental calculus, pathogens

Introduction

The study of ancient teeth provides invaluable insights into the diet, health, and lifestyle of past populations. Unlike artifacts or written records, teeth offer a uniquely direct connection to the lives of ancient communities. Their durable, mineralised structure often makes them the best-preserved human remains, capturing essential information about individuals and their societies. Teeth are the only part of the skeleton that directly interacts with the environment, and being composed of dynamic tissues, they are able to reveal a broad range of information about past and present lifestyles. They can disclose information about physiology, stress adaptation, genetic diversity, social customs, diet, migration patterns, growth, development, oral and general health, and also can serve as important identifiers in forensic analysis.¹

While dental pathologies have been studied for many years, recent advances in scientific techniques have expanded the ways we can now analyse teeth.²⁻³ Different parts of the tooth can serve specific purposes in investigations, with each tissue lending unique strengths based on its

characteristics. Enamel, for instance, can aid in determining biological sex, while the soft tissue of the pulp, being protected within the pulp chamber, is particularly suited for molecular analysis. Cementum provides a particularly rich source of DNA, and both enamel and dentine, being more resistant to postmortem degradation than bone, are valuable in stable isotope analysis. Dental calculus, meanwhile, preserves within its matrix ancient biomolecules and dietary microfossils, offering insights into past diets and health. Each of these various tissues contributes distinct and important information, allowing researchers to answer a broad range of questions about ancient populations.

Determining Age in Teeth from Cold War Nuclear Testing

In mass disasters, accidents, or terrorist attacks that involve multiple victims, one of the highest priorities is to confirm each individual's identity using methods such as fingerprinting, dental analysis, and DNA typing. These procedures can be challenging when remains are severely degraded or a significant amount of time has passed since death. In such cases, assessing the age of the

deceased becomes important. For children this estimation can be reasonably accurate when based on dental development charts. It becomes more complex for adults, where age assessment relies on evaluating degenerative changes in skeletal bones resulting from natural wear and tear. However, the complexity of the aging process, individual biological differences, and various environmental factors can affect accuracy, often compromising results.⁴

An innovative method has been developed to estimate age with notable precision by measuring radiocarbon levels in tooth enamel. The radiocarbon, a result of nuclear bomb testing during the Cold War, serves as an accurate indicator of an individual's date of birth. Age can be determined to within 1.6 years, whereas the commonly used morphological evaluation of skeletal remains and occlusal tooth wear can yield error margins of ± 10 years.^{5 6 7}

The concentration of natural radiocarbon, or carbon-14 (^{14}C), in the atmosphere relative to all carbon has remained fairly constant at around 1.2 parts per trillion for many thousands of years.

However, nuclear weapon detonations in the 1950s and early 1960s temporarily doubled the amount of ^{14}C in the atmosphere compared to typical carbon levels. Following the 1963 Partial Nuclear Test Ban Treaty, which prohibited atmospheric nuclear testing, these elevated levels began to decrease exponentially.

Carbon in the atmosphere combines with oxygen to create carbon dioxide, which plants absorb during photosynthesis. By consuming plants - or animals that eat plants - the concentration of ^{14}C in living organisms closely matches atmospheric levels at any given time. Since enamel does not regenerate after its initial formation, the ^{14}C concentration in enamel remains a preserved record of atmospheric ^{14}C levels from the time of its development.

The ^{14}C content in tooth enamel can be analysed using accelerator mass spectrometry and then compared with known historical atmospheric ^{14}C concentrations, which vary year by year. This comparison enables researchers to estimate the date of enamel development against a timeline of known atmospheric ^{14}C levels. By identifying the

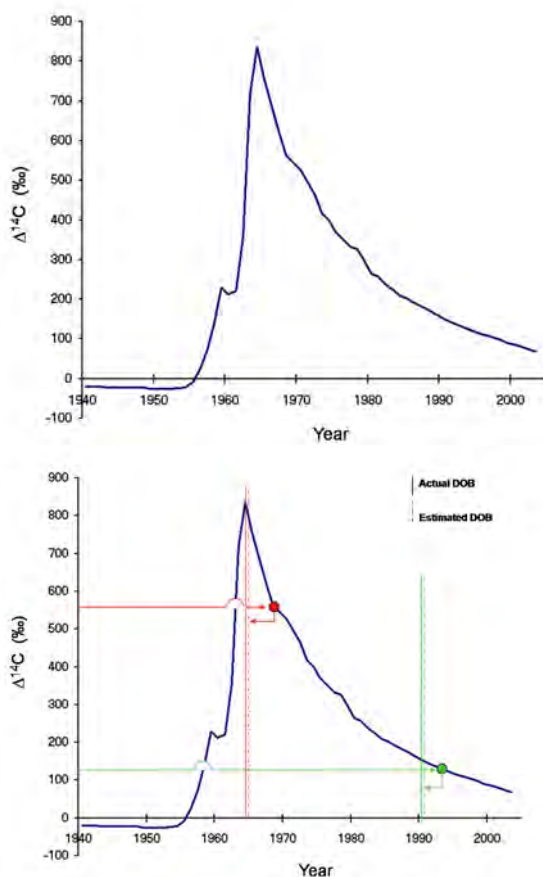


Figure 1a (Above) Northern hemisphere atmospheric ^{14}C concentration as a function of time.

1b (below) To estimate an individual's date of birth, the level of ^{14}C measured in tooth enamel is plotted on to the curve of atmospheric ^{14}C against time (blue) to find the year of enamel synthesis (right-pointing arrows). The known age at enamel formation for individual teeth is then subtracted from the year obtained to give the date of birth (left-pointing arrows; dashed vertical lines). Two representative cases are shown; two teeth were analysed for the case depicted in red, and one tooth for the example shown in green. Solid vertical lines represent the actual date of birth.

[Reproduced with permission from Bucholz et al. 'Year of birth determination using radiocarbon dating of dental enamel,' *Surface and Interface Analysis*, 2010⁶]

start of enamel development and factoring in the tooth's growth period (as determined by dental calcification tables), it becomes possible to estimate an individual's year of birth with a high degree of accuracy for those born from the 1950s onward (Fig. 1).

Revealing Biological Sex: Determining Identity through Dental Enamel

Biological sex determination is important in the analysis of ancient human skeletal remains as it enhances our understanding of the biological and social dynamics of past societies. Traditionally, this estimation relies on two main methods: assessing sexually dimorphic features in skeletal size and shape, and DNA sequencing.^{8 9 10} However, determining biological sex in skeletal remains is challenging, particularly due to environmental and taphonomic processes that degrade both the bones and DNA over time. When remains do deteriorate, it becomes difficult to examine osteological features typically used for sex identification, such as pelvic and cranial morphology, since these structures may now be damaged or incomplete. aDNA analysis, likewise, depends on good aDNA preservation, which is frequently compromised in ancient remains by exposure to factors like moisture, temperature fluctuations, and soil chemistry. Moreover, aDNA testing is both time-consuming and expensive, making its large-scale application to human remains from archaeological sites uncommon.¹¹

Biological sex assessment is particularly challenging in subadult skeletons. In immature remains, the skeletal traits typically used to distinguish between male and female are not yet fully developed, as many sexually dimorphic characteristics only become apparent after puberty. Consequently, the osteological markers reliable in adult sex estimation are far less dependable in the young, limiting the accuracy of sex determination in younger individuals.

A more recent approach, involving enamel amelogenin proteins - essential for the development of tooth enamel - has been outlined by several researchers.^{12 13 14 15} Proteins are more robust than DNA, especially when bound to mineral surfaces like enamel, giving them a higher

likelihood of surviving in archaeological samples. The process involved in this technique entails extracting amelogenin peptides from tooth enamel through minimally destructive surface acid etching of the tooth enamel. The resultant etch solution is treated and analysed by means of liquid chromatography and mass spectrometry. This enables the identification of sex chromosome-linked isoforms of amelogenin, allowing biological sex to be determined from a single tooth.

This minimally destructive acid etching technique offers several advantages. It preserves the overall anatomical structure of the tooth and is equally applicable to both deciduous and permanent teeth, as well as to skeletons with absent, degraded, or unclear osteological sex markers. Furthermore, the method is quick and more cost-effective than aDNA sequencing.

Tracing Ancient Diets and Migrations through Stable Isotope Analysis

Isotope analysis of human remains has become a well-established technique in archaeology, offering valuable insights into ancient diets, migration patterns, and environmental conditions.^{2 3} This technique is based on the principle that the isotopic composition of human and animal body tissues reflects that of the food and water they consumed throughout their lives. Isotopes are variants of the same element, and it is the assessment of the ratio of different isotopes or 'isotope signatures' in a sample, that are utilised in this technique, enabling archaeologists to reconstruct key details of the past.^{16 17 18}

In archaeological contexts, bones and teeth are the longest-surviving body tissues, making them the primary sources for isotope analysis. Bone, often preferred for its high collagen content, can provide valuable isotopic data but is susceptible to post-depositional changes that may alter its original composition. Teeth, on the other hand, offer excellent preservation of biogenic elements due to their structure, which resists breakdown and decay, and formed during early life it retains a record of the individual's diet and location during the period of enamel formation.¹⁹

The reconstruction of ancient diets has been

extensively studied through stable isotope analyses, offering significant insights into ancient lifestyles. Studies focusing on dietary variation within an individual's lifetime are less frequent. With advances in techniques such as mass spectrometry, it is now possible to analyse extremely small samples, facilitating the isolation and isotopic examination of specific sections of teeth.^{20 21}

Third molars are particularly valuable for studying dietary patterns, as they primarily develop during the second decade of life. By analysing carbon and nitrogen isotopes in serial micro-sections of these teeth, researchers can reconstruct dietary shifts over relatively short intervals, typically spanning 0.5 to 2 years. Stable isotope analysis of individuals from a hunter-gatherer site in Central California (c. 500 BC–AD 800) has revealed substantial dietary variability. Notably, some individuals experienced significant dietary changes over their lifetimes.²² These findings suggest transitions between different food sources, possibly linked to movement or resettlement. Such data are instrumental for understanding dietary variation both within and between individuals over time.

Historically, the study of immigration and mobility among our distant ancestors relied heavily on written records. Today, stable oxygen isotope analysis allows researchers to trace these movements with greater precision. For example, isotopic data from the enamel of first and third molars of individuals from medieval and post-medieval Trondheim, Norway, have uncovered insights into the ages at which people migrated as well as the directions of their journeys.²³ To enhance accuracy, researchers combine oxygen isotope analysis with strontium isotope analysis, as this dual approach helps to account for dietary and physiological factors that may otherwise influence single element isotopic values.^{24 25} Together, these methods offer a clearer and more comprehensive view of past human migrations.

Ancient Climate Change: Traces in the Fossil Record

With record-breaking heat waves and unprecedented floods wreaking havoc globally, climate change has become one of the more

urgent issues of our time. Historically, climate shifts have also played a critical role, influencing famine, migration, and the disruption of political systems.²⁷

Climate change can be traced through variations in oxygen isotope ratios in tooth enamel, specifically the balance between lighter oxygen-16 (^{16}O) and heavier oxygen-18 (^{18}O), a measurement known as $\delta^{18}\text{O}$. When water is consumed, these isotopes are incorporated into developing teeth and bones, reflecting the $\delta^{18}\text{O}$ levels of local water sources, which vary with temperature, altitude, precipitation, and evaporation. Warmer or drier periods cause surface water to become enriched with the heavier ^{18}O isotope, raising $\delta^{18}\text{O}$ levels, whereas cooler or wetter conditions reduce them. Consequently, comparing isotope values of people from different historical periods but the same location can reveal past climate fluctuations.

Since teeth do not remodel during life and are resistant to chemical changes after burial, they can preserve climate records over extensive timescales. By analysing these ancient environmental markers, researchers can explore how climate shifts may have influenced human evolution, providing insight into how early humans adapted to their changing world.

A study demonstrating the value of this technique analysed teeth and bones from the remains of forty-eight ancient Egyptian mummies held in museums in Lyon, France. The mummies, originally excavated from various archaeological sites along the Nile, were dated, based on stylistic and archaeological evidence, to between approximately 3500–500 BC.²⁸ To assess changes over time, researchers analysed ground samples of tooth enamel and bone apatite to determine oxygen isotope levels. The results showed an approximate 3 percent increase in $\delta^{18}\text{O}$ values from the earliest to the later mummies, suggesting either a decrease in rainfall or rising temperatures during this period. This shift reflects the onset and progression of an increasingly arid tropical climate in ancient Egypt and, more broadly, Northeast Africa during this period.

Stress in the Past: Cortisol Markers in Ancient Teeth

Cortisol, a glucocorticoid hormone produced in the adrenal glands, is a key biomarker of stress, and has an important regulatory function in cardiovascular, metabolic and immunological systems.²⁹ Typically, cortisol levels are measured through saliva, urine, or hair samples. However, these methods capture only free or unbound cortisol and require repeated sampling over time to reliably measure chronic stress. Previous efforts to explore stress across different societies and historical periods have been limited by methodological constraints.³⁰

Recent studies reveal that cortisol integrates into tooth structures, possibly through the bloodstream or saliva. This discovery suggests that cortisol levels preserved in teeth may provide a long-term record of stress.³¹ By using enzyme-linked immunosorbent assay (ELISA) to analyse cortisol in ancient teeth, researchers can gain insights into the stress experiences of past populations, offering a unique perspective on historical health and well-being. Although still in its early stages, this technique shows significant

promise. Further research may well prove it to be a valuable tool for exploring stress levels in archaeological contexts, given the durability of teeth over time.

Ancient DNA in Teeth and Dental Calculus: Revealing Insights from the Past

Modern DNA techniques have wide-ranging applications across many fields offering insights into human history, health, and identity. In forensic science, DNA testing plays a critical role in solving crimes and verifying identities. In medicine, it drives advancements in vaccine development, cancer therapies, and disease prevention strategies. Additionally, DNA analysis plays a key role in paternity testing and has broad applications in agriculture, helping improve crop and livestock management.

Beyond these modern uses, ancient DNA extracted from teeth and dental calculus is providing unprecedented glimpses into the lives of our ancestors. aDNA analysis enables the determination of an individual's sex,^{32 33 34} the establishment of familial relationships^{35 36 37} and



Figure 2 Gross calculus deposition on a male mandible from Theban Tomb 291 at Deir el-Medina, Egypt. c. 1350 BC.

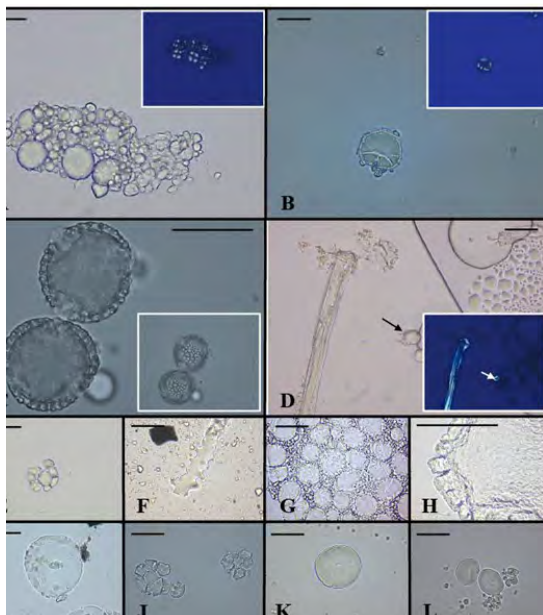
[Reproduced with permission from Anne Austin]

tracing of ancient population migrations.^{38 39 40} Additionally, it offers phylogenetic information⁴¹ and facilitates the identification of historical disease pathogens.^{42 43 44}

aDNA sampling of teeth, although optimised for efficient DNA extraction, is inherently destructive as it involves drilling, sectioning and powdering the sample. A far less invasive alternative involves extracting aDNA from cementum on the surface of the root. This method is efficient and minimally destructive, requiring only a scraping of the tooth roots with a blade.^{45 46} Dental cementum, rich in cementocytes, contains a significantly higher proportion of endogenous DNA compared to dentine from the same tooth. In contrast, enamel is primarily inorganic and contains minimal DNA. Additional sources of DNA include the connective tissue within the dental pulp and dental calculus (see below).

Figure 3 Images of starch granules and other microremains entrapped within dental calculus utilising light microscopy. A–I are archaeological, J–L are modern starch references. The scale bar represents 20 µm.

[Reprinted with permission from Gismondi et al., 'Back to the roots: dental calculus analysis of the first documented case of coeliac disease', Archaeological and Anthropological Sciences, 2020]⁶⁶



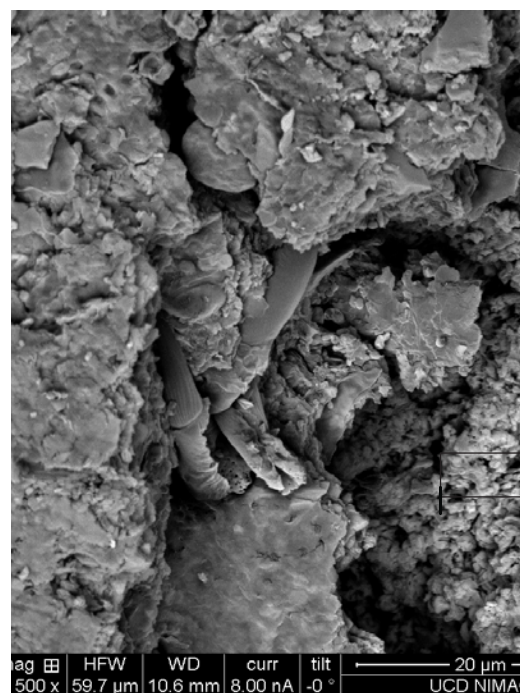
Proteomics in Archaeology and Dentistry – New Frontiers

Proteomics is the study of proteins which includes their function, structure, and interactions. Proteomics has many applications including archaeology and various biomedical disciplines, including genetics, molecular biology, medicine, and dentistry. In dentistry, the analysis of salivary proteins is valuable for detecting conditions like periodontitis and oral cancer. In oral cancer, proteomics plays a crucial role in the early detection and enhanced diagnosis by identifying specific biomarkers present in oral fluids. Additionally, it contributes to the development of targeted, highly effective therapies.^{47 48}

In archaeology, proteomics is increasingly employed to analyse teeth and dental calculus, particularly with advances in techniques such as

Figure 4 A small invertebrate entrapped in dental calculus of a wild chimpanzee revealed in a scanning electron microscope image.

[Reproduced with permission from Robert Powers and Heiko Temming]



high-throughput, high-resolution tandem mass spectrometry. Studies of ancient dental calculus offer valuable insights into the diets of past populations, uncovering evidence of plant, animal, and dairy consumption—food sources often undetectable through traditional microscopic analysis.⁴⁹ This research also enables the identification of specific crops, particularly in cases where micro- and macro-botanical remains have not survived.

Unlocking Secrets in Dental Calculus - Unexpected Analytical Insights

Dental calculus is recognised as a secondary aetiological factor in periodontal disease, and being a prominent plaque retentive factor, it is routinely removed by the dental team to maintain oral health. Dental calculus also holds significant potential in forensic science, providing valuable information for identifying human remains and assisting in determining causes of death. In recent decades, calculus has also gained attention as an insightful tool for reconstructing ancient diets and health patterns, revealing fascinating aspects of historical lifestyles (Fig. 2). The advantage of using calculus is that it is not an inherent part of the

skeleton, but a secondary material and thus this may overcome curatorial concerns regarding preservation of ancient specimens.

Optical Analysis:

Dental calculus can be analysed using a simple optical microscope technique, which involves degrading the sampled deposits with dilute hydrochloric acid, rinsing the residue and then mounting on a slide for detailed examination. This approach enables the visualisation of embedded microparticles, including cereal fragments, plant fibres, pollen grains, seeds, animal hairs, parasites and tiny insects that may have become trapped accidentally^{50 51 52} (Fig. 3). For higher magnification and enhanced detail, scanning electron microscopy can be utilised, allowing for a more comprehensive examination of these preserved particles⁵³ (Fig. 4). During calculus formation, airborne and waterborne debris, including microdebris from craft activities can become incorporated into the calcifying matrix.⁵⁴ One notable example is the discovery of blue particles in the dental calculus of an 11th-century middle-aged woman buried at a monastic site in Dalheim, Germany. Elemental analysis identified the



Figure 5 Portrait of Agnès Sorel, c. AD 1456, mistress of Charles VII of France -

source unknown - Wikipedia Public Domain

particles as lapis lazuli and these particles were found to be distributed across calculus in many of the teeth, suggesting multiple, separate exposures rather than a single event.⁵⁵ Lapis lazuli was commonly used to illuminate high-quality manuscripts in monastery libraries, where women often worked as scribes.^{56 57} While the exact method of entrapment remains unclear, it is well-documented that scribes would lick their brushes to achieve a fine point for detailed artwork. This practice inevitably introduced lapis lazuli into their mouths.

In another case, preserved cotton fibres, were found embedded within the matrix of dental calculus from individuals dated to the 6-12th century AD in North Ohio, USA. The fibres were identified as *Gossypium spp*, a cotton not native to that particular region and which would suggest contact with groups to the south where this type of cotton was cultivated. This interaction is corroborated by archaeological evidence of cotton and marine shell exchange. The fibres may have become lodged during activities such as using teeth as tools to help in spinning cotton, offering valuable insights into craft practices and trade networks in early North America.⁵⁸

Forensics:

DNA analysis is the benchmark for forensic identification. When human remains are degraded or fragmented, teeth and bones may be the only sources of aDNA available. Alternatively, in situations where destructive sampling is not permitted, calculus has emerged as a viable alternative, providing sufficient DNA for identification purposes.

Dental calculus can also provide insights into historical and modern drug use. Using a highly sensitive technique known as ultra-high-performance liquid chromatography-tandem mass spectrometry, a wide range of pharmaceutical and psychoactive substances preserved within calculus deposits can be detected. These drug traces, originating from direct oral contact or the inhalation of smoke or vapor, include substances such as heroin, cocaine, and opium. This method offers a unique means of identifying drugs that may have been missed in blood samples during autopsy, shedding light on substances that could

have influenced the cause of death. Beyond modern forensic investigations, this technique also enables researchers to explore the use of drugs and stimulants in ancient societies.⁵⁹

Heavy Metal Poisoning:

Dental calculus can retain traces of toxic heavy metals, with the concentrations of these metals serving as indicators of environmental exposure. Heavy metal toxicity poses significant health risks, and various analytical techniques, such as transmission electron microscopy, have been employed to detect these elements in calculus.⁶⁰ Cadmium, a common trace heavy metal, has been linked to smoking through elevated levels found in calculus, a factor associated with an increased risk of oral cancer.⁶¹

A classic historical case is that of Agnès Sorel, mistress of King Charles VII of France, who died in AD 1450 under mysterious circumstances (Fig. 5). Analysis of her calculus revealed extremely high levels of mercury, sufficient to suggest acute mercury poisoning as a likely cause of death. Several theories have emerged: it is possible that Agnès was treated with mercury for her roundworm infection, a common practice at the time. Mercury was also used to treat women in labour for difficult deliveries and Agnès was known to have borne four daughters by Charles VII. However, the presence of such a high dose of mercury has also raised suspicions of foul play. Given Agnès's considerable influence over the king, it is possible that her power may have earned her enemies at court, although it still remains uncertain whether her death was intentional or accidental.^{62 63}

Shedding Light on Ancient Disease and Medicine through the Study of Calculus

Dental calculus also serves as a repository for oral microbiota, a complex community of microorganisms, including bacteria, viruses, and fungi, which habitate the oral cavity. During the formation of calculus, DNA from these microorganisms becomes embedded within the calcified matrix. This incorporation enables the identification of systemic pathogens in human remains, even when other indicators of disease are absent, which then enables the detection of

systemic pathogens in human remains, even in the absence of other disease indicators.

For example, aDNA analysis identified evidence of leprosy in the calculus of a 16th-century individual from Trondheim, Norway.⁶⁴ Similarly, next-generation sequencing of calculus samples from an elderly woman at a prehistoric site in the San Francisco Bay area revealed elevated levels of *Neisseria meningitidis*, a bacterium commonly associated with meningitis.⁶⁵ Furthermore, molecular analysis of dental calculus from a Roman woman, preserved at the National Archaeological Museum of Cosa in Tuscany, provided what is believed to be the earliest historical evidence of coeliac disease.⁶⁶

It is known that ancient peoples used plant-based remedies to treat various medical disorders, as attested by material culture, archaeobotanical analyses, and historical texts. This is now further supported by the detection of signs of medicinal plants in calculus.^{67 68} For example, evidence of certain bitter-tasting plants, with no nutritional value, containing compounds such as yarrow and camomile, have been identified in the calculus of Neanderthals. Their presence may suggest that Neanderthals selected and used specific plants for their medicinal properties.⁶⁹ In an early medieval population from Colonna in central Italy, dating to the 8th-10th-century AD, analysis of dental calculus revealed evidence of various medicinal

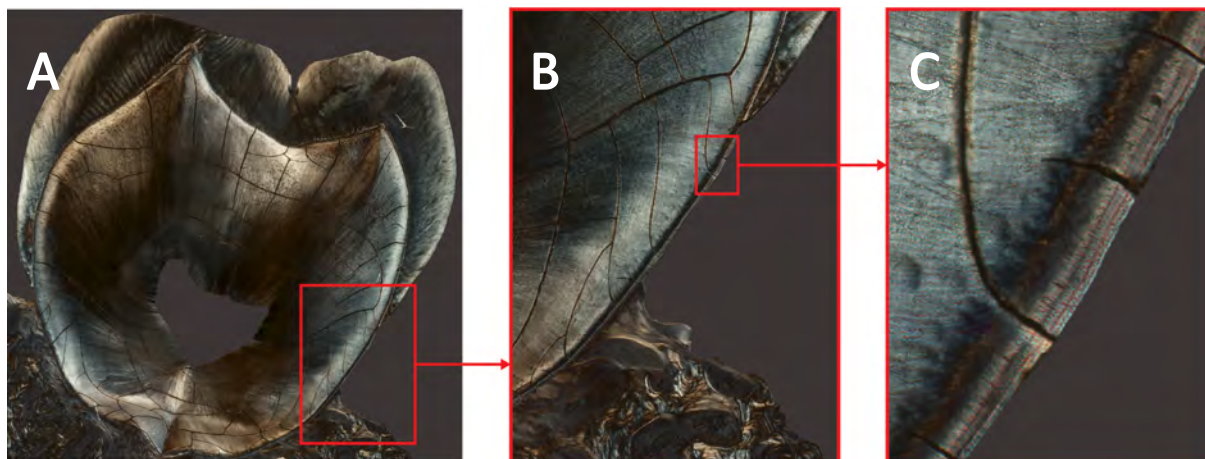
plants. These included *Digitalis sp.*, which is used in treating heart conditions; *Hyssopus officinalis*, recognised for its antiseptic and expectorant properties; *Artemisia sp.*, which has digestive, antiseptic, antimalarial, and expectorant benefits; and *Ephedra sp.*, a bronchodilator and vasoconstrictor.⁶⁸

Ancient Dental Pulp - What can it tell us about the Past

The dental pulp is housed within a protected cavity, shielded from external exposure by enamel, dentine, and cementum. These durable, mineralised tissues resist degradation over time, making the pulpal tissue an excellent repository for detecting ancient blood infections through aDNA and protein analysis.⁷⁰ Extracting aDNA from dental pulp is also more straightforward than from skeletal tissue, as it eliminates the need for decalcifying the hard tissues.⁷¹

Molar teeth are frequently the preferred choice for sampling due to their larger pulp volume, which correlates with a higher aDNA yield. The pulp chamber can be accessed either through the occlusal surface of the crown⁷² or via the root apex,⁷³ which then permits tissue sampling using endodontic instruments. Both methods minimise damage to the morphological integrity of the tooth.

Figure 6 Image of cementum in polarised light - a longitudinal section of a maxillary second molar. a) Whole tooth section. b) Magnified view of panel A. c) Further magnification of panel B. To the left is the dentine, covered by the layers of cementum with three distinct cementum bands visible [Reprinted from Cerrito et al., 'Parturitions, menopause and other physiological stressors are recorded in dental cementum microstructure', Scientific Reports, 2020]⁹⁰



Molecular analysis of dental pulp has been able to resolve some key historical cases, such as identifying the pathogen responsible for Bubonic Plague, which wiped out 30-50% of medieval Europe's population. Prior to this, diagnoses were primarily based on historical records and clinical descriptions. In 1998, researchers successfully detected *Yersinia pestis* DNA in pulpal tissue from victims interred in well-documented plague cemeteries, providing definitive evidence of the disease's cause.^{74 75 76}

Another historical debate concerns the pathogen behind the 'Plague of Athens' in 430 BC. For centuries, scholars depended solely on the ancient account of Thucydides, the Athenian historian and general, which permitted various potential diagnoses. Recent analysis of aDNA extracted from pulpal tissue of individuals in a mass burial pit in Athens, dating to this period, has identified typhoid fever as the most probable cause.⁷⁷

Trace Element Levels in Modern and Archaeological Teeth

Trace elements are minerals present in very small quantities in body tissues, typically comprising less than 0.01 percent of the body weight. Many of these elements act primarily as catalysts in enzyme systems, while also playing a crucial and complex role in metabolic processes. Imbalances—whether deficiencies or excesses—can result in noticeable clinical effects, and monitoring trace element status through tissue sampling is essential for identifying and correcting such imbalances.⁷⁸ Additionally, assessing trace element levels provides valuable insights into environmental conditions⁷⁹ and offers physiological information about diet, growth, and reproduction.⁸⁰ This technique also allows for the detection of ancient nutrient deficiencies and toxic exposures.⁸¹

Teeth are suitable indicators of exposure to a wide range of trace elements due to their high degree of mineralisation and crystalline structure. Deciduous teeth, in particular, are easily accessible because of their early exfoliation.^{82 83} However, studies have shown that certain burial conditions allow compounds, such as soluble lead, to infiltrate and

accumulate in enamel.⁸⁴ A detailed analysis of trace elements in both contemporary and ancient dental enamel allows researchers to differentiate between samples that are naturally preserved and those affected by environmental pollutants.

It has long been accepted that fluoride, related to the trace element fluorine, plays an inhibitory role in the development of dental caries. There are some indications that other environmental trace elements such as molybdenum may also affect caries experience.^{85 86}

Understanding Physiological Events - The Role of Cementum Microstructure

Enamel, dentine, and cementum all grow incrementally, with alternating periods of slower and faster growth reflected in the incremental markings within each tissue. These markings, detectable through histological or ultrastructural examination, reveal variations in growth rates during development.⁸⁷ Similarly, physiological stressors, including birth, weaning, malnutrition, disease, climate, and lifestyle changes, can disrupt normal matrix formation, leading to distinctive abnormal growth lines.⁸⁸

Unlike enamel and dentine, cementum is continuously deposited throughout an individual's life and is not subject to remodelling.⁸⁹ Consequently, early life events, along with major physiological processes such as childbirth, menopause, and various diseases, are preserved in the cementum as distinct histological markers.⁹⁰ These physiologically demanding periods produce narrower cementum growth layers due to a reduced rate of mineralisation by the cementoblasts. Advances in histological techniques and digital imaging technologies, including real-time microscopic imaging, now enable researchers to examine growth lines, which appear as shifts in tissue refractive index, and correlate them with specific life events⁹¹(Fig 6). Additionally, a new analytical approach has been developed to estimate the age at which these events occurred.⁹² Histological analysis alone, though, cannot differentiate between types of events, making elemental analysis of the growth

lines essential for further distinction and clarification.

Conclusion

Teeth are disproportionately prevalent in archaeological sites and have long been a focal point of research, providing valuable insights into the diet, health, and lifestyles of past populations. The integration of advanced scientific techniques in odontology has greatly expanded our ability to uncover detailed information that would otherwise be obscured in the archaeological record. These advancements not only deepen our understanding of ancient societies but also highlight the potential for future discoveries, as continued innovations in methodology are likely to reveal even deeper insights into the lives of our ancestors.

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Editor's note

Sir Edwin Saunders, he with the Blue Plaque mentioned in the editorial, was the first to develop the concept of ageing children through their dental development. His obituary states that 'in 1840, as a result of the abuses of the Factory Act in the matter of the falsification of the register of age, Sir Edwin investigated the date of eruption of various teeth and for this purpose visited most of the public schools around London. He published the results under the title 'Teeth, a Test of Age' and this became adopted by the Inspectors of Factories and led to the detection of an immense amount of fraud.'

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Shining some light on the cause of lip cancer and gaining invaluable knowledge of another country – a personal reflection on the 1981 RDH Overseas Scholarship

Jerry Asquith

Abstract

Lower lip cancer constitutes between one and two per cent of all carcinomas and sunlight was thought to be a major causative factor. Combining personal recollection and reflection, the author describes his early education and career and his introduction to research into this important topic. Travelling from Kent to London to Dallas, Texas and back to London, he explains the importance of mentorship and international exchange and co-operation in career development and research.

Keywords lip cancer, aetiological factors, exchange scholarships

Introduction

I obtained my secondary education at The William Harvey Grammar School in Folkestone. Ironically, although founded over 350 years ago by one of England's greatest biologists, it had no biology department in the 1970s when I was there.

In my final year, Professor Eric Laithwaite, remembered for his development of the linear induction motor and maglev rail system, awarded the prizes and spoke at School Speech Day.¹ His regular Christmas lectures at The Royal Institution inspired many, including myself. He calculated that our school's influence was so significant that one in every 200 English electronic engineering graduates was an alumnus of our school.

At that time the school had produced no dentist in my living memory. However, the careers master, Peter Read, was keen for me to study for that profession because I enjoyed studying science and making things. I held the British record for making the smallest origami flapping bird. With Peter's guidance and encouragement, I pursued dentistry. He discovered I had not seen a dentist for many years due to a bad experience when I was young: I had sat down for treatment when my mother pulled me from the chair, accusing the dentist of smelling of drink. It put her and me off attending for many years. Peter immediately booked an

appointment for me to see his dentist who happened to have been in the same year at dental school as the Dean of the Royal Dental Hospital of London (RDH). Consequently, I too applied to RDH.

A dental career

Fortunately, the entrance requirements for medicine and dentistry had changed in 1977. Mathematics was accepted as an alternative to Biology along with Physics and Chemistry 'A' levels. Passing all three, I gained a place at RDH. I was informed that a catch-up course would be provided before the term started for anyone who had not previously studied biology. However, as there were only two of us, it was not worth running the introductory course, but the school said we should be fine!

The first year was a formidable challenge. My initial histology lecture was so bewildering that I had to put in 24 hours of background reading before the next one but we non-biologists managed to pass the 2nd BDS exam

The Dean was initially Professor Geoffrey Howe, a distinguished oral surgeon. He left at the end of my first year to set up the Prince Phillip Dental Hospital and School in Hong Kong,² later becoming its inaugural Dean. Professor William Houston, the head of the Department of Orthodontics, then

became Dean. When Professor David Poswillo arrived to take over as head of oral surgery his influence on my professional life was profound.

Poswillo asked students interested in conducting original research to contact him. Simultaneously, I became captivated by the topic of lip cancer, a topic which remained with me for life.

Lip cancer

Lip cancer constitutes between one and two per cent of all carcinomas, a significant global health concern.³ It is commonly found in elderly white men in tropical climates, making it a disease with a far-reaching impact.

Until the 1970s, sunlight was thought to be the main culprit. However, Szpak found little correlation between lip incidence and proximity to the Equator, despite the strong correlation

between latitude and skin cancer incidence.⁴ Belamaric showed in Hong Kong that lip cancer only accounted for four per cent of oral malignancy amongst the Chinese (due to pigmentation of the lips).⁵ Ratzkowski pointed out that occidental Jews, Asian Jews, Christians and Arabs exhibit very different susceptibility to the disease when exposed to a similar environment.⁶ Other aetiological factors cited included pipe smoking, rural environment, outdoor occupations, and a fair, ruddy complexion with blue eyes. Spitzer summarised published findings on tobacco as a risk factor in the disease and concluded that it was of little relevance.⁷ (This agreed with the results of their research)

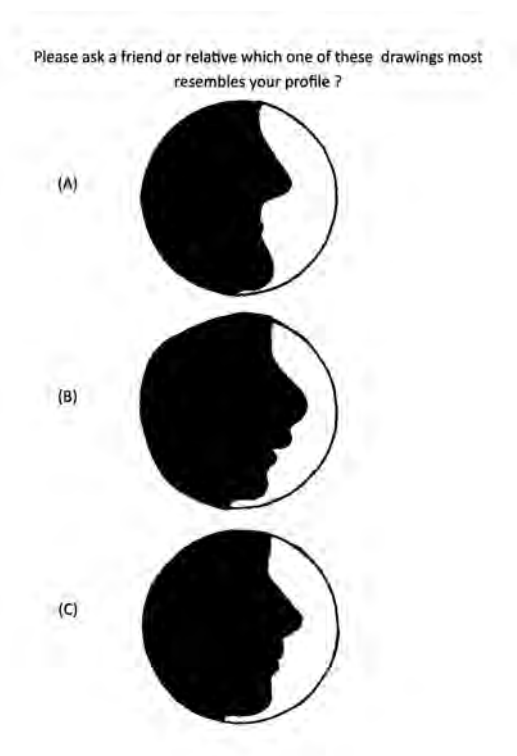
Lower lip tumours accounted for about 95% of all lip tumours,⁸ sometimes as much as 98.6%.⁹ If it is accepted that the only difference between the upper and lower lip is its ability to absorb sunlight, then prognathic people would have a higher susceptibility to the disease, or at least retrognathic people would have a lower susceptibility.

According to Cenzato et al., the approximate incidence of people with skeletal Class I is 73%, Class II is 20%, and Class III is 7%.¹⁰ As sunlight falling on the lips is accepted as the principal aetiological factor, it seems reasonable that, due to the incredibly high proportion of lower lip lesions, there should be a significant tendency towards skeletal base III jaw relations or a tendency away from skeletal base II jaw relations. Since Class III incidence is only 7% of the population, they are unlikely to account for 95% of the disease.

A potential research project

I found this extraordinary and wondered if it might be because lower lips stick out more than upper ones. A hypothesis was developed to explore any differences in the incidence of upper and lower lip cancer and to determine if it is based upon significant embryological difference between the lips. The upper lip is formed from the maxillary process and the lower lip from the mandibular process, while the epithelial covering of the two lips originates from the stomodaeum.¹¹

Figure 1 Facial profiles drawn by the author and used to identify subjects' skeletal relationship



This difference in the embryology of the mesodermal components of the lips may have little effect on the malignant potential of the ectodermal-derived epithelia covering the lips. But Karring et al proved that the tendency of epithelia to carry out one of its most basic functions, i.e. to keratinise, is determined by the underlying mesodermal-derived tissues.¹²

I approached Poswillo with my thoughts, and he was eager to help. I wanted to evaluate the importance of different aetiological factors. A questionnaire given to a study and control group might highlight the significance of the different factors. As I could not examine the patients, I produced a silhouette of classic Class I, II and III jaw relations and asked a friend or relative to choose the one that most resembled the patient (Figure 1). The second part of the questionnaire asked about all the factors cited in the papers I had read as potentially causative or protective factors. This included age, sex, nationality, occupation, smoking and drinking habits, hair and eye colour, complexion, and whether you were of Irish or Scottish ancestry.

Poswillo suggested that I contact six cancer units within the UK to ask if I could send their patients my questionnaire. Five did not respond or could not help. However, Henry Shaw, who ran the Head and Neck Department of The Royal Marsden Hospital, London was keen to help.

Figure 2 Jerry at his desk at the John Peter Smith Hospital

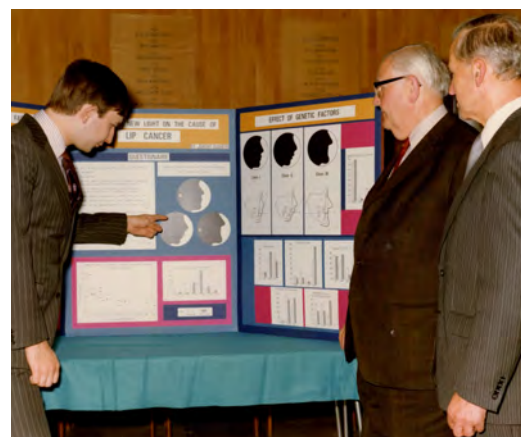


The American experience

One major problem was that before computerisation, there were relatively few patients that I could access. RDH had an Overseas Scholarship for final-year students to study abroad. With Poswillo's help I was awarded the 1981 Scholarship. Szpak had shown that the incidence of the disease in the Dallas-Fort Worth area was the highest in the USA.⁴ Poswillo's friend, Bruce Epker, ran the Maxillofacial Department at John Peter Smith Hospital in Fort Worth, Texas, so I went there.

I flew to the USA on 31 July 1981. At John Peter Smith Hospital I met Bruce Epker, the chief of surgery, and his deputy, (now Professor) Larry Woolford. One of the interns said Americans loved our subtle British humour as they had just started to screen The Benny Hill show on cable television so I soon settled in at the hospital. Spare moments in the evenings and at weekends were spent helping out in the Emergency Room (ER), sometimes assisting with operations. I met with Professor Eugene Frenkel, head of pathology, to discuss how best to proceed with my research. It was agreed that I could review his department's biopsy day book and retrieve the records of anybody having surgery on their lips. This was very time-consuming, but as I was there for three months, time was not an issue. The Veterans Administration Hospital and Parkland Hospital in

Figure 3 Displaying the poster to Professor Howard Tonge (L) and Sir Frank Lawton (R)



Dallas plus John Peter Smith provided a large cohort of patients to study.

Some American memories

I had a desk and a typewriter in John Peter Smith Hospital. I was left to my own devices to produce the questionnaire that Professor Frenkel had approved and mail it to anybody who had been treated for lip cancer. The desk (Figure 2) was previously used by a lady whose son was the lead guitarist of the pop group 'the Monkees'.

Before the advent of computers work was carried out on a typewriter. If an error was made the usual option was to destroy the page and start again, which was time-consuming and frustrating. A few years previously the pop star's mum had devised another solution. She mashed up small pieces of paper and dissolved them in solvent to obtain a paste. She applied some of this over the error to cover the mistake. She initially gave this liquid to friends and colleagues. Later she sold it around the hospital and set up a company manufacturing it commercially, as Tippex.

The ladies in the department were fascinated by my accent. Once one of their children was brought in to sit next to me for the morning in the hope my accent would rub off on them!

Fort Worth contains Hell's Half Acre, a major part of the Wild West and sometimes the scene in the ER resembled those days. Once two brothers, well into their 70s, were viewing TV at home when an argument developed regarding which programme to watch. In typical Texan fashion each grabbed a pistol and shot the other. Texas law at the time was that if you shot somebody and they lived, it was merely a felony. Guns called 'Saturday night specials' were popular as they were not very powerful and so unlikely to cause a fatality. The two brothers were brought into the ER with survivable gunshot wounds and deemed not to be a high priority, so were left in the corridor until somebody was available to examine them. After about an hour they started arguing again. Soon afterwards the sounds of gunfire were heard: nobody had thought to disarm them.

Whilst in Dallas I saw diseases never encountered

in England, including several Rocky Mountain Spotted Fever cases. One elderly gentleman had several nosebleeds and attended the ER on numerous occasions. Each time, the doctors eventually stopped the bleeding and sent him home. His family were worried about the cause of these recurrent haemorrhages. One afternoon, the intern to whom I was attached spent half-an-hour taking a history from the gentleman and made a diagnosis. He was born in the Far East, emigrated to the USA in his teens and lived with his parents until he was 40. They resided in an impoverished neighbourhood where his father couldn't work because he was blind. With little more to go on my colleague performed a biopsy of a lesion on his nose which confirmed a diagnosis of lepromatous leprosy.

After President Kennedy was shot in 1963, he was rushed to Parkland Hospital, the primary trauma unit for central Dallas. Parkland was just like the hospital in Fort Worth but much larger. The trauma unit was enormous, with many gunshot wounds and stabbings being treated at any time. I worked in Trauma Room 1 (TR1) where Kennedy was treated. Once I lunched with an elderly doctor who had worked in Parkland on that day, 23rd November, 1963. He said they had about five minutes warning that the president had been shot. When the cavalcade arrived at the hospital it was evident that the president's injuries were not survivable but four surgeons hurried off with the president to TR1.

Parkland County hospital had a prison wing. One patient under our care had been responsible for the Dallas 'Kentucky Fried Chicken' murder, walking into a takeaway shop and killing several people. He was arrested, convicted of murder and sentenced to the electric chair. While waiting for execution he got into a fight with another prisoner and sustained a broken jaw. I thought he would merely have his jaws wired together for a couple of weeks until he was executed. However, I learned that he had the right to demand the best treatment possible. It was decided to reconstruct his jaw with expensive titanium plates so that he could eat his remaining meals free of pain.

I visited him daily, got to know him well and became friendly. On one occasion, I noticed a man

Table 1 Age distribution of the study and control groups

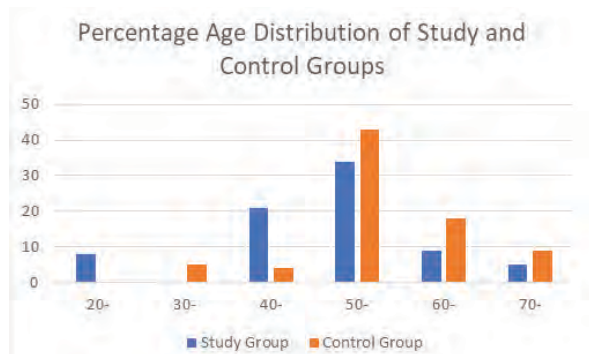


Table 2 Ancestral history of the study and control groups

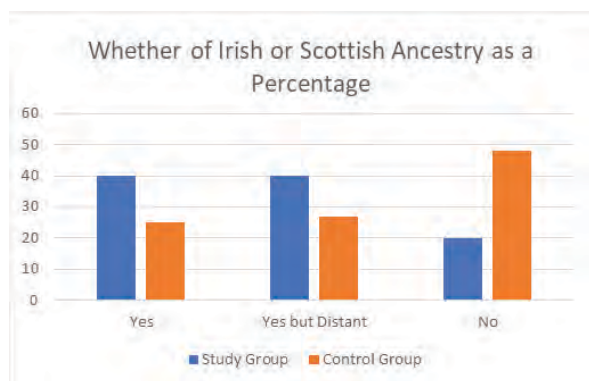
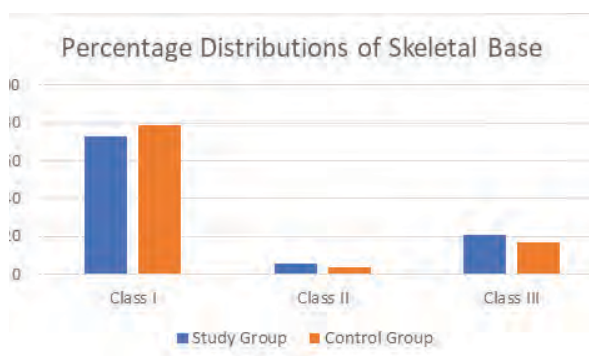


Table 3 Distribution of skeletal patterns



in the same room cuffed by both wrists and ankles to the bed. I said to my patient. "You have killed numerous people and can walk around quite happily; what has that man done to deserve being manacled to the bed?" He beckoned me towards him and whispered in my ear. "He's a really mean man." I could only guess as to what crimes he had committed!

Research progress

I needed to compare my study group of lip cancer patients with a control group so found about a hundred people of roughly the same age and sex. Both groups would complete a questionnaire so I could compare them.

The hospital administrator said I would need approval from five different committees about the control group which could take up to nine months. It seemed ridiculous that I had not needed permission to study the cancer patients, which one would have thought would have been more heavily protected. I set the ball rolling when I left his office and asked people to fill out my questionnaires anyway. I thus managed to get my control group set up and left the country before there could be any follow-up. The day before leaving I completed the control group, with 98 elderly men filling in the answers, matched as well as I could to the study group of 67 patients.

The results

Due to the relatively small numbers, detailed statistical analysis was not considered appropriate, but several broad conclusions can be drawn. Table 1 shows the age distribution of the study and control groups. As with Spitzer's work, tobacco and alcohol were not seen as critical aetiological factors.

Generally, people with blue eyes, fair hair and pale complexions were slightly more susceptible to the disease. The most relevant factor was whether the patient had Scottish or Irish ancestry. (Table 2). It is not obvious to the outsider that Dallas has a high proportion of residents of Irish or Scottish heritage, but Irish

immigrants played a large part in early Texas history. At the Battle of San Jacinto one seventh of the Texan force were Irish born.

Finally, the results of the skeletal base analysis confirmed my original thoughts (Table 3). The study group has a slightly higher percentage of Class II patients. Although there is a more significant number of Class III patients, I would suggest that this does not indicate that lower lip cancer patients tend to have protruding lower lips.

Life outside dentistry

The social life in Dallas was excellent. I was invited to many parties. I often found myself a source of entertainment, due partly to my accent and partially to satisfy their thirst for knowledge about England and all things English. They found some words hysterically funny, for example my description of a drunk as being legless. At one of these parties, to impress me, a nurse told me that she had had a couple of glasses of wine and was beginning to feel a little legless. I found this comment as amusing as she had the original word. When she was taking me back to the hospital later, I casually asked if she owned a gun. She replied that she possessed three: one under her car seat, one under her bed and the other in her handbag, all of which I could quite understand. However, when she told me that she kept a hand grenade in the car's glove compartment I started to doubt her sanity: I could not understand how valuable a hand grenade would be in an enclosed space.

I was sorry to leave Dallas as I had enjoyed my time there. On the last day, they held a small leaving party for me. Dr Epker's Secretary said David Poswillo had rung her every week to check that I was alright.

Back in the UK

I was the RDH entrant in the British Dental Association Student Clinician Programme in June 1982. Figure 4 shows me presenting my findings to the judges, Professors Howard Tonge and Sir Frank Lawton. I also presented my findings at the British Association of Oral and Maxillofacial Surgeons' Scientific Meeting in April 1983 (Figure 3). After

five years in maxillofacial surgery, I went into general practice, Chairing the LDC Conference for the UK in 2009 and being appointed a Special Adviser to the health minister. In 2014, I became president of The King's College London Dental Alumni, being the only general practitioner ever elected Alumnus of the Year in 2015. I retired in 2019.

Conclusions

While my work did not confirm the hypothesis that lower lips have a higher predetermined susceptibility to malignancy, the idea that lower lip cancer patients have protruding lower lips, and that is why they are more prone to cancer, appears to be refuted. This refutation is significant as it challenges a commonly held belief in the medical community, prompting further research and potentially leading to new understandings of lip cancer.

My student visit was a revelation of the professional benefits of international exchanges. It not only broadened my medical knowledge but also honed my ability to work independently and solve logistical problems in a foreign country. The exposure to a high level of trauma in the ER was initially bewildering, but it ultimately provided a solid foundation for my subsequent years in the UK treating maxillofacial injuries. The friendships I formed during this time, such as with my flatmate who later became the chief maxillofacial surgeon in The US Military Hospital in Baghdad during the Second Gulf War, are a testament to the enduring impact of such experiences.

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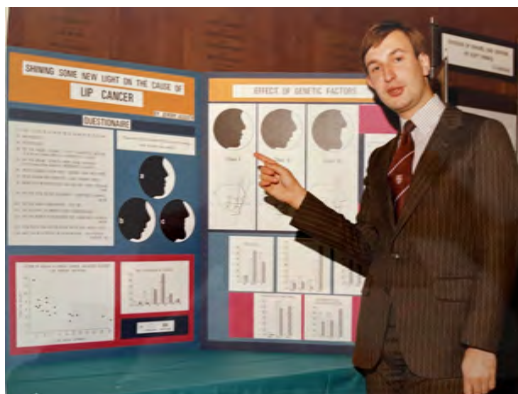
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I would like to thank Professor Stanley Gelbier for his help and support in writing this paper



Jerry presenting the poster, clearly showing the profile images

The John Peter Smith Hospital today, little changed from the 1980's



General dental practice teaching for undergraduates – personal reflections on an innovative project at Sheffield in 1980.

Christopher Turner

Abstract

In the mid 1970s thought was being given to ease the entry of newly qualified dentists into general dental practice. In response to this, the University of Sheffield Dental School (USDS) pioneered the Transitional Training Unit (TTU), a five-surgery general dental practice near to, but separated from the dental school. Final year dental students attended on one session per week. Details of how the TTU was established and opened in 1981 and the problems experienced are described here. Other institutions have copied the Sheffield model and by 1983 the TTU proved important for the continuing future of USDS, at a time when the General Dental Council were looking to close more dental schools. Forty-four years since opening, the TTU continues in the same building to train dental students, following the original concepts.

Keywords dental education, Sheffield Dental School, general dental practitioners

Introduction

By the mid 1970s there was increasing recognition that there was an educational need help dental students make the move or transition into general dental practice, the career destination for the majority on qualification. A one-year vocational training post experience was being trialled in Guildford. However, the then Dean of Dental Studies in Sheffield, Professor Paul Bramley (later Sir Paul), thought that final year students should have training for dental practice and proposed the establishment of a Transitional Training Unit (TTU) outside but near to the Charles Clifford Dental Hospital for this purpose.

Funding was shared between the University and the NHS for the set-up costs for a five-surgery general dental practice. The University provided premises at 19-21 Northumberland Road, 50 yards from the dental hospital and builders from their works department to carry out the conversions while the NHS gave the not inconsiderable sum of £120,000 to pay for all the conversions and surgery equipping, and more for ongoing annual staffing costs.

The post to lead this new development was

advertised in the summer of 1979 as a Senior Lecturer/Consultant in the Department of Dental Health.¹ I applied and interviews were held in early November. I was successful and due to commence in post on 2nd January 1980. A consultant at age 34 years-old – a proud moment - but my start date was delayed for two weeks because of a pre-booked family holiday.

I was told that when I arrived the building conversion would have started but when I finally arrived in mid-January 1980, the building work had not started. The accommodation was an old house with four floors on a prominent corner site. The cellar would house the compressor and central suction unit and the top floor a common and locker room for dental nurses. On the ground floor the two largest rooms were already occupied by Professor Peter Burke, an orthodontist, and his secretary. Four other rooms would give space for two surgeries, a waiting room and a plaster room for students to cast their own alginate impressions. Upstairs, I had my office that was shared with my general dental colleagues when they attended, three surgeries, a large space designated as a library that became a most useful storage area when our supplies were delivered, and an X-ray room. The latter was lined with

special plasterboard and furnished with both a conventional cone machine and an orthopantomography and processing machine.

On arrival, I was advised that I would be expected to present my plans to the Regional Health Authority who were the source of ongoing NHS funds by the end of the month. My basic plan was for each of the five surgeries to have its own dental nurse who could teach four-handed dentistry and provide chairside support. I would recruit general dental practitioners to help with the teaching and supervision workload and use real NHS forms (FP17s) to record work completed. I rejected using NHS dental note folders on the grounds that were filling and extraction oriented, and had no provision for periodontal records. I wished to add a treatment plan form for students to write down what they intended to do, in the order that what they planned showed the start and completion dates of each item, for staff monitoring purposes. These were, of course, the days before computerised records.

The cabinetry was supplied by Baxters of Bradford who helped with layout design for each surgery and units from KaVo via their Sheffield branch office. Each surgery had an autoclave and all instruments provided through tray systems. I purchased forceps and surgical instruments from local Sheffield craftsmen and in the process saved a lot of money from my budget.

Educational development and discord

Within 3 months of my appointment, in April 1980, there was a significant development. It was agreed that I should form a new department within the dental school encompassing both general dental practice, community services and dental public health called the Department of Dental Services. I was able to appoint the then District Dental Officer, Roger Heesterman, as a Visiting Lecturer. Together, we prepared a course of 10 lectures to prepare students for their new training experience given in the summer term before they started in the following September; students who would attend the TTU for one session per week in their final year and would be required to complete a project relevant to general dental practice and prepare a case folder showing how prevention had

worked, a simple case and a complex case of patients they had treated in the unit.

At about this time I received a letter from the Professor of Restorative Dentistry, E L Hampson, telling me that he had instructed his staff not to talk to me about his teaching methods. I had been aware that his department had not wanted an outsider appointed to head the TTU, and that his preferred candidate had not been appointed. Hampson was well known for being 'old school,' never referring to anyone by anything other than their surname. In my opinion, his teaching methods were also out of date and of concern.

For example, he taught traditional Black's cavities with extension for prevention at a time when this was no longer in fashion. We did not teach that in the TTU and students were provided with smaller size burs. Hampson encouraged students to work in pairs on prosthodontic clinics which meant one student was always a passive observer. Because we employed dental nurses, this was not a problem. He taught complete dentures using the Gerber method,² a technique I was unfamiliar with and therefore the TTU did not treat patients requiring complete dentures. In endodontics, the teaching for acute pulpitis was extirpation then leaving the tooth on open drainage with later preparation using reamers. We would teach extirpation followed by preparation of the root canal using files.

Despite these differences, my clear aim was that in my department, we would teach best practice techniques relevant to general dental practice.

Staffing and support

There was also a vast amount of paperwork. My first appointment was a secretary who would have a later combined role as receptionist once the unit opened to patients. The building work continued and needed supervision from time to time. There was also the need to think about recruiting staff. Five qualified dental nurses transferred to the TTU from the dental hospital. We advertised for GDPs to join the teaching staff and were delighted to appoint 4 local practitioners. We were able to arrange weekly get-togethers where we could discuss what we would teach over the whole range

of both restorative dentistry and minor oral surgery. This proved to be a very important aspect as my team and I could discuss best practice, refine our thinking, and have a common and agreed basis for our teaching.

We recruited a local dental laboratory which would collect and deliver prosthetic work daily. Any crown and bridgework was forwarded to John Broughton's laboratory in Newbury. Students soon learned how to complete their laboratory request forms legibly and with clarity.

It had been expected that the unit would open for patients in January 1981 but building delays meant that this was only possible at the beginning of March. Despite that shortened teaching year, those first students met the department's requirements for completing NHS forms, their projects and some case reports. We were on our way. It was interesting too how the students developed. They were no longer attending for say a prosthetics session, but for dentistry in its widest meaning, taking in their stride the wide array of issues with which their patients presented and learning to prioritise and organise a holistic treatment plan. The next two years passed very

quickly. There was some staff turnover and Professor Richard Johns arrived from Guy's to take over the Department of Restorative Dentistry in October 1981.

As the 1982-83 academic year started, we were informed that there would be an inspection by the General Dental Council (GDC) in early Spring 1983. It was rumoured that the GDC were looking to close another dental school and that the choice was Leeds or Sheffield. As Leeds had recently been upgraded, Sheffield was definitely on a hit list and so it proved. I still remember the final meeting between my fellow Heads of Department and the GDC. The knives were poised to fall until Paul Bramley intervened (Figure 1). His advocacy stressing the unique importance of the TTU in training dental students was still in its infancy and it needed time to develop further saved the day. Closure was averted although I am sure members of staff are unaware just how close-run that was.

Personal changes

I missed seeing patients and clinical work in the early days of setting up the Unit but this was resolved by Paul Bramley. I would provide restorative care for oral surgery patients requiring reconstructions post-surgery and this led to a very happy period working with him and his colleagues until I left Sheffield.

For the whole time since my appointment in Sheffield, my family had stayed in Winchester and I had commuted weekly, a four hour drive each way, weather permitting, that was proving to be quite tiring. I applied for and was appointed to be Director of Community Dental Services in Salisbury, commencing in late autumn 1983. I would be working nearer my family. In retrospect for my career, it was a mistake, but I developed an excellent working relationship with my successor at the Unit, Peter Rothwell. After Sheffield my career has followed various pathways. As I was leaving Paul Bramley advised me that 'once a consultant, always a consultant.' I hope I have lived up to that expectation.

Figure 1 Professor Sir Paul Bramley



Conclusion

It is pleasing to note that the pioneering concept developed at Sheffield as the first general dental practice teaching unit in the UK separate from a dental school, has been copied by others, notably the Maurice Wohl unit at King's. The Sheffield unit continues and has been enlarged to ten surgeries. As I reflect on those years, my thanks are due to the students whom passed through the unit, the nurses for managing their surgeries as well as teaching four-handed dentistry and my dental colleagues for their dedicated contribution and support.

Author biography

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100 years ago

Nottingham Journal - Friday 28 August 1925

Dearth of Dentists

Fewer young men are taking up the career of dentistry. This fact emerges from the confirmed minutes of the Dental Board of the United Kingdom for the first half of the present year, which have just been published. It is expected that the numbers of students registering will be even less in 1926. At a time when the need for skilful dentistry is becoming more ever recognised, when increasingly the dentist's attentions are being sought for small children, and the public generally becoming more enlightened on the need for healthy teeth, it is essential that the supply of efficient dentists should be kept up from year to year.

Training scheme

The Dental Board however has taken a hand in remedying the matter for the three years 1925-6-7 and have allocated a sum approximating to £7,500 for the purpose of educational grants. Next month a number of candidates will be examined and, subject to their qualifications and means, will be eligible for valuable bursaries. The grant they will receive if successful may cover the whole of the tuition fees at dental hospital for four years. In addition, they may be provided with essential books and instruments, microscope, dental engine and other tools. Where necessary a grant will be made towards maintenance during training.

Benjamin William Fickling CBE FDS FRCS LRCP MGDS (1909-2007), the Royal College of Surgeons of England and the MGDS diploma

Stanley Gelbier

Abstract

In the 1970s the Dental Faculty of the Royal College of Surgeons of England realised the need for a qualification for general dental practitioners to demonstrate their knowledge and skills, as did the FDS for future specialists. Ben Fickling was asked to produce a plan and see it through to fruition, which he did, the first MGDSs being awarded in April 1979.

Keywords Benjamin Fickling, Faculty of Dental Surgery, general dental practitioners, Membership in General Dental Surgery diploma

The Royal College of Surgeons of England and dentistry

The Royal College of Surgeons of England received its Royal Charter in 1843. In 1860 it became involved in the assessment of dental education and training. In that year the Licence in Dental Surgery diploma was established as the first UK dental qualification as part of a drive to elevate dentistry from a trade to a profession. The other royal colleges followed in 1879.

Following the establishment of a Faculty of Dental Surgery within the college after World War 2 there was a move to introduce a dental qualification equivalent to the Fellowship of the Royal College of Surgeons (FRCS). Thus was born the FDS in 1947, just in time for the establishment of the NHS. It became an important requirement during the training of consultants in dental surgery. They theoretically covered most of dental practice in the hospital service but really concentrated on oral surgery. The other royal colleges followed with their own Fellowship exams and diplomas.

The only other dental consultants at the time were orthodontists, replicating the hospital situation prior to 1948. In 1954 the college introduced a

diploma in orthodontics (DOrth) qualification, following the 1949 establishment of a diploma in dental orthopaedics (DDO) by the Faculty of Physicians and Surgeons of Glasgow which saw a need for formal training and examination for future specialists.

The issue for general dental practitioners and a new faculty

The very strong surgical base of the FDS did not appeal to many general practitioners. Further, the RCS Faculty Board had a strongly consultant membership, who general dental practitioners (GDPs) felt didn't understand their needs.

Following moves by groups of general practitioners and the British Dental Association supported by UK postgraduate dental deans (responsible for NHS postgraduate education), an Advisory Board in General Dental Practice was set up in the Royal College. In 1992 it became the Faculty of General Dental Practitioners (UK). The brackets indicated it was shared jointly by all the Royal Colleges although managed under the umbrella of the English college. It was later renamed the Faculty of General Dental Practice (UK). From 2005 entry was possible for dental care

professionals (DCPs) registered with the General Dental Council; and in 2011 for dental students in years 4 or 5 of their undergraduate degree.

That faculty was absorbed into the new College of General Dentistry in 2021.

Benjamin Fickling and the Membership in General Dental Surgery (MGDS)

Ben Fickling (Figure 1) was elected as a member of the Faculty Board in 1957 and became the Dean in 1968, remaining until 1971. Although an oral and maxillofacial surgeon he was greatly interested in raising standards for GDPs.

The Board supported proposals from its GDP committee for a suitable programme of training and qualification to test the knowledge and skills of general dental practitioners. The idea was strongly supported by Kenneth Liddelow (Figure 2), Dean of the Faculty who steered it through the Faculty and College. Thus was born the MGDS of the Royal College of Surgeons in the mid-1970s.

Fickling was asked to plan and see the idea through to fruition. As chairman of examiners from 1978 he presided over the first Membership in General Dental Surgery exam in 1979, remaining an examiner until 1981.

In acknowledgement of his contributions to the advancement of general dental practitioners, in 2001 Fickling was awarded honorary Fellowship of the Faculty of GDPs, at the age of 92 years.¹

The MGDS entry requirements and examinations

In a 1981 paper for the BDJ Fickling provided detailed information about the MGDS requirements and examination, which differed greatly to those for the FDS.²

He wrote that although most candidates would be general dental practitioners, dentists working in the forces or community services could also apply. Candidates had to possess a qualification registrable in the UK Dentists Register. They were required to produce evidence of working in dental

practice for not less than 8 years after qualification, of which not less than 4 must have been in general practice in the United Kingdom or in an approved equivalent such as HM Armed Forces dental services.

Candidates also had to show evidence of having attended at least 50 sessions of postgraduate study in the past 4 years.

The format of the examination

The candidates had to select four patients and prepare for each of them a full record of care: the log diaries. One copy of each diary plus a completed questionnaire describing the practice and premises were submitted before the examination. The diaries were studied by the examiners before the candidates presented for the exams.

Two diaries were discussed with the patients present and examined as close as possible to the candidate's practice. The other diaries were examined without a patient present using a viva format. On the same day there was an oral test.



*Figure 1
Benjamin
Fickling CBE
(courtesy of
the BDA
Museum)*

The written papers

There were two written papers. A 3-hours essay paper gave a choice of one out of two questions on the basic sciences relevant to clinical practice.

In addition there were four compulsory questions on any aspect of general practice.

There was also a 2-hours multiple choice short answer paper. Its twenty questions were designed to cover the entire field of dental practice. Candidates were warned to answer all the questions rather than only a few in depth. Two examples given by Fickling were: (a) give methods of localising a buried root in the first molar region of the edentulous upper jaw; and (b) list in order the necessary steps to be taken for successful etching of enamel.

The log diaries

The diary was an account of the patient's dental problems, treatment and relevant records. They were to be clearly set out, typed mounted and bound. Included were details of the medical and dental conditions at the start of treatment, any special features, the treatment plan and a record of treatment provided. Copies of radiographs and models were to be provided.

As indicated above two diaries were examined alongside the respective patients. For the other log diaries, viva candidates had 10 minutes to set out any other relevant items brought with them. These were studied by two examiners with the candidate present to clarify any information if desired. There followed a 20-minute discussion, the scope of which could be extended widely.

The questionnaire on practice premises

After entry to the exams was agreed candidates were sent a questionnaire to answer on their practice accommodation and facilities. It was completed and submitted in a folder like the log diaries plus a form to assist the examiners to assess the practice, scale drawings showing essential fittings and equipment and photographs.

Oral examination

For the oral candidates had 15 minutes to study one or two problems set out with notes, models, radiographs and so on. Each candidate discussed them with the first examiner for 15 minutes and then with a second examiner.

The final assessment

The results from each part of the examination and matters arising from the questionnaire were considered at a meeting of all the examiners. The first exam was held in April 1979.

The first MGDS presentation day

Before the first examination candidates were presented with their MGDS diplomas on 15 June 1979 the Faculty Dean, Professor Ken Liddelow CBE, presented the examiners (Table 1) with certificates of membership. The Faculty had not originally intended to confer any diplomas of membership other than by examination. However that would disbar the examiners gaining the diploma. Fickling received the College's Colyer Gold Medal on the same day.³

Originally 60 practitioners registered for the exam but the final entry was actually 37 people. The names of the successful candidates are listed in Table 2.

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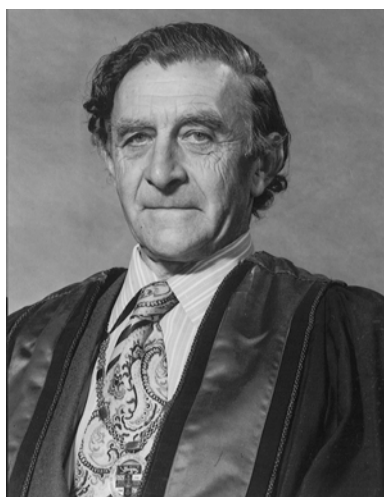


Figure 2 Kenneth Peters Liddel CBE (From the Library of the Royal College of Surgeons of England)

Table 1 The first MGDS examiners

BW Fickling CBE
 Prof R Basker
 ID Gainsford.
 EW Harridine

L Lafosse
 JD Strahan
 JW White
 G Wootliff
 R Miller Yardley OBE

Table 2 The first successful MGDS candidates in April 1979

Sydney Bernard Stern,
 Marcus Rattebury Bennett
 Louis Deyong Kramer
 Peter John Willard
 David Ellis Hooper
 Michael Stern
 John Franklin Reeves
 Philip John Eric Lang
 Alfred Alan Riley
 Brian Westbury
 Kenneth Roberts
 Gwilym Ieuan Davis.

Edgar Ramsey Gordon
 Mohinda Paul Singh Plahé
 Gordon Felix Holmes
 Richard Bryan Mouatt
 Sandra Jean Affleck
 Christopher John Bell
 Antony Lionel Wolfish
 Thomas Michael Anthony Heesom
 John Barry Phillips
 Michael Anthony Preiss
 Allen Robinson Dinning
 Derek Lindsay Lodge

Formation of the Faculty of General Dental Practice: the problematic 'UK' suffix

Stephen Rear MBE and Sir Nairn H F Wilson CBE

Abstract

The most recent account of the formation of the Faculty of General Practice, originally the Faculty of General Dental Practitioners, is provided by Santini et al.¹ This historic note focuses on the problematic issue of the Faculty, hosted by the Royal College of Surgeons of England, adopting a 'UK' suffix - FGDP(UK).

Keywords Faculty of General Dental Practice (UK), Origins, Royal Surgical Colleges

Background

From the outset FGDP was conceived to be a UK-wide body, with the intention to become an independent college within a few years of formation. It was proposed, as an interim arrangement en route to becoming an independent college, that the Faculty, while hosted by the Royal College of Surgeons of England, be an intercollegiate faculty of the three Royal Surgical Colleges – the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh and the Royal College of Surgeons and Physicians of Glasgow, each having equal representation on the Board of the Faculty, i.e. the Faculty of General Dental Practitioners of the Royal Surgical Colleges of England, Edinburgh and Glasgow. The Royal Surgical Colleges were, however, opposed to the concept of an intercollegiate faculty at the time, both for legal reasons and not wishing to invite a flood of proposals for intercollegiate faculties in every surgical specialty, which could threaten the fiercely defended independence of the three Royal Surgical Colleges. This posed a problem for the FGDP, which wished to be identified as a UK-wide organisation, providing a collegiate home for all general dental practitioners (GDPs), including GDPs in Scotland who may have had some affiliation, loyalty or simply affection for one of the Royal Surgical Colleges based in Scotland. The solution was to accede to the demand of the Independent College – the proposed College of General Dental Practitioners' Group¹ to add a 'UK' suffix to the name of the Faculty – Faculty of

General Dental Practitioners (UK), and, in addition, to plan to hold educational and diploma ceremony events across the UK, specifically in Scotland.

Problems

When approached, the Royal Surgical Colleges in Scotland objected vehemently to the FGDP, as a part of the Royal College of Surgeons of England adopting, a 'UK' suffix – both the Royal Surgical Colleges in Scotland considering themselves to have UK-wide roles and responsibilities extending to primary care dentistry. The Privy Council declined to take a position on the matter, suggesting faults on both sides of the argument for and against the adoption of the suffix. The General Dental Council (GDC), in granting general recognition to the Faculty's Diploma in General Dental Practice (DGDP) determined, in accordance with the GDC's standard usage, that the abbreviation to designate the diploma would be 'DGDP RCS Eng', i.e. with no reference to the Faculty, let alone the use of a 'UK' suffix.

Diplomacy

Voluminous correspondence then ensued through the last quarter of 1992 and first quarter of 1993, involving, amongst others, Stephen Rear, the founding Dean of the FGDP and driving force behind the initiative, the Presidents and then Deans of the Faculties of Dental Surgery of the three Royal Surgical Colleges, and Sir David Mason CBE, the then President of the GDC. This correspondence and concurrent discussions

culminated in the matter being discussed at a meeting of Joint Surgical Colleges in Dublin in April 1994. At this meeting, the Royal Surgical Colleges agreed not to oppose the adoption of the 'UK' suffix by the FGDP, but grudgingly, given the view of the Royal Surgical Colleges based in Scotland that the use of the suffix would cause irritation until either the FGDP realised its ambition to become a free-standing College, or the use of the suffix was discontinued. If the Royal Surgical Colleges in Scotland had known that the FGDP(UK) would continue to exist until 2021, rather than become a free-standing college within a matter of a few years, they may have been less inclined to agree to the adoption of the suffix.

Subsequent developments

Despite the Royal Surgical Colleges in Scotland nursing their irritation over the adoption of the 'UK' suffix by the FGDP, they agreed to provide observers to serve on the Board of the Faculty, made their facilities available to the FGDP(UK) for educational purposes – examinations, courses and, in the case of the Royal College of Surgeons of Edinburgh a FGDP(UK) diploma ceremony. Also, the Dental Deans of the Royal Surgical Colleges invited the Dean of FGDP(UK) to join meetings of the Joint Meeting of Dental Faculties (JMDF).

Over time, whatever irritation was caused by the FGDP adopting the 'UK' suffix, subsided and faded away. When the FGDP(UK) finally separated from the Royal College of Surgeons of England to meld into the newly formed College, intended Royal College of General Dentistry, the use of the 'UK' suffix, together with the Faculty, became a matter of history.

Concluding remarks

The hard won, albeit begrudged acceptance of the adoption of the 'UK' suffix by the FGDP was important to the Faculty in promoting and maintaining a UK-wide presence and influence during its extended relationship with the Royal College of Surgeons of England. This extended relationship included a failed attempt to combine the FGDP(UK) with the Faculty of Dental Surgery of the Royal College of Surgeons of England, and restructuring arrangements by the host Royal

College of Surgeons of England, which eroded the independence of the FGDP(UK). This erosion of independence made the eventual separation of the Faculty from the Royal College of Surgeons of England, and the formation of the College of General Dentistry all the more difficult – a matter for a subsequent paper.

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¹Santini,A, Gordon,E & Wilson,NHF The history of the College of General Dentistry:The formation of the Faculty of General Dental Practice. *Dent Hist* 2024; 69: 7-15.

Acknowledgement

The authors are most grateful to Dr Edgar Gordon for reviewing this note to confirm the accuracy of its contents.

Author biographies

Stephen Rear

Retired General Dental Practitioner. Founding Dean of the Faculty of General Dental Practitioners UK and formerly chairman of the Royal College of Surgeons of England Faculty of Dental Surgery Advisory Board in General Practice.

Sir Nairn Wilson

Emeritus Professor of Dentistry and Founding President Emeritus of the College of General Dentistry. His many, different positions have included Editor of the Journal of Dentistry, Dean of the University Dental Hospital of Manchester, King's College London Dental Institute and the Faculty of Dental Surgery, Royal College of Surgeons of Edinburgh and President of the General Dental Council and British Dental Association.

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Harry Goldman and his dental survey of boarded-out children in Cambridge.

Fiona Gray

Abstract

This paper is based on the materials donated to the BDA Museum by the relatives of Harry Goldman, who contributed a survey of children's dental condition and treatment over a period of 3 years (1906-08). The results of this survey demonstrated the benefits of early intervention, thereby reducing the dental and general health problems associated with dental neglect.

Key words: Harry Goldman, George Cunningham, dental survey, dental clinic for children.

Introduction

Harry Goldman was born in 1883 in London, married in 1909 and died in his eighties. He spent most of his career in dental practice in West Hampstead, London.

He had no formal dental qualifications and was practising prior to the Dentist Act of 1921. Entries in the Dental Register state his date of registration as 1922, as a consequence of the Dentists Act. This act made registration mandatory for new dentists. Those practising before this date were able to register without formal qualifications.

As a non-qualified dentist, membership to the British Dental Association (BDA) would have been denied to him.

Prior to Goldman's move to practise in London, he was apprenticed to George Cunningham, in Cambridge, and contributed a significant paper with regards to children's dental health and the necessity for the provision of dental clinics.

Previous studies provided evidence of the poor condition of children's teeth but Goldman's study followed a cohort of children for 3 years, together with dental intervention.

Cunningham and his work in general

George Cunningham (1852-1919), was a man of many interests and an influential player within the

dental profession, both as a practitioner and with his involvement in dental politics.

He studied medicine in Edinburgh and continued his studies in Paris together with dentistry.

Following an academic year at Harvard, he was one of the first to gain Doctor in Medical Dentistry (DMD) in 1876. Consequently, he acquired LDS RCS without further examination.¹

He was a founder member of the BDA in 1879 and near the end of his life was made an Honorary member. In 1883, he set up a practice in Cambridge and became involved in dental politics pursuing his interests. With an interest in the international community, Cunningham co-founded the International Dental Federation (FDI) in 1900.²

He was strongly associated with the founding of 'School Dentistry', the inception of the idea belonging to William Macpherson Fisher of Dundee who wanted compulsory dentistry for school-aged children. Cunningham continued the fight and was encouraged by such clinics opening in European countries.¹

Cunningham and Goldman connection

Goldman was apprenticed to Cunningham in Cambridge, and was considered to possess 'remarkable manual dexterity'.¹ In a reference from Cunningham, written in 1908, it was stated that he had worked with him for 3 years as a dentist and

technician. His work had included fillings, root canal treatments, orthodontics, crowns and bridges, and the treatment of children.

The BDA was interested in improving the condition of children's teeth and preventing the problems associated with dental disease. George Cunningham and William Macpherson Fisher, amongst others, produced 7 reports² between 1891 and 1897 which were published by the BDA.³ The intention was to provide evidence of the poor dental condition of school-aged children at various ages and to demonstrate the effects this had on their growth and development and their future health.

In 1906 Cunningham asked Goldman, who was working as his assistant, to help in founding a dental clinic for children. This was to be the first in the country. For 3 years he gathered statistics from 'boarded-out' children. These were orphaned, destitute or vulnerable children that were boarded out to a host family, an early form of fostering. At the age of fourteen, it was usual for these children to move back to a central home in order to receive technical or domestic training. Those children treated at the clinic were from the surrounding villages of Cambridge, some of whom had come from London.

The results of this study were used by Cunningham to persuade Lloyd George, then President of the Board of Education (BOE), for dental treatment to be freely available to all children. Lloyd George only had access to a fund worth £50 so Sedley Taylor, a Fellow of Trinity College and a patient and friend of Cunningham,

became the benefactor with the sum of £500.¹ The first clinic was opened in Cambridge in 1907 with Cunningham becoming the Dental Director. The funding of the scheme was taken over by the Town Council the following year.¹

Goldman left the practice in Cambridge and moved to London to start his own practice. He submitted the results of his study from his practice in 128 West End Lane, London.

Despite his distinguished career and many years committed to the dental profession, including his work to establish School Dentistry, Cunningham's later years were impoverished. Following Cunningham's collapse in the street and admission to hospital in 1919, Goldman's name was found in his pocket and he was contacted. When Cunningham died not long afterwards, Goldman paid for his funeral and for his burial in Highgate cemetery so avoiding a pauper's grave.¹

The survey

Goldman carried out the only known dental survey on boarded-out children living in the Cambridge area. Unlike the previous reports by the BDA Committee, Goldman's study followed the dental condition of the original sample of children and how they progressed with treatment and improved oral hygiene. His research was spread over three years, 1906 to 1908 and demonstrated the effectiveness of early intervention. The results of this study were summarised in a paper Goldman wrote in 1909 – 'Three years' periodical dental treatment of



Figure 1 Image of a toothbrush similar to those used in the study

Figure 4 A results table from the published study

B TABLE.		1906.		1907.		1908.	
		Temporary.	Permanent.	Temporary.	Permanent.	Temporary.	Permanent.
The number of Gutta Percha fillings	...	—	—	2	—	—	—
There were no Cement fillings	...	—	—	—	—	—	—
The number of Amalgam fillings	...	48	81	27	56	5	9
„ „ Amalgam & Cement fillings	...	—	5	1	4	—	5
„ „ Amalgam and Root Treatments	...	—	2	—	3	—	—
„ „ teeth treated with Nitrate of Silver	...	2	—	8	—	4	—
„ „ teeth extracted	...	87	3	20	4	23	2

* All the children had their teeth scaled and cleaned.

During July and August 1906, 65 children were examined and treated (36 girls and 29 boys) between the ages of 3 and 15 years. 44 children had treatment, either fillings or extractions. The observations and treatments were noted in charts (Figure 2).

Only 8 children had toothbrushes, which were of no use, and all were given new ones. Cleaning and scaling were carried out.

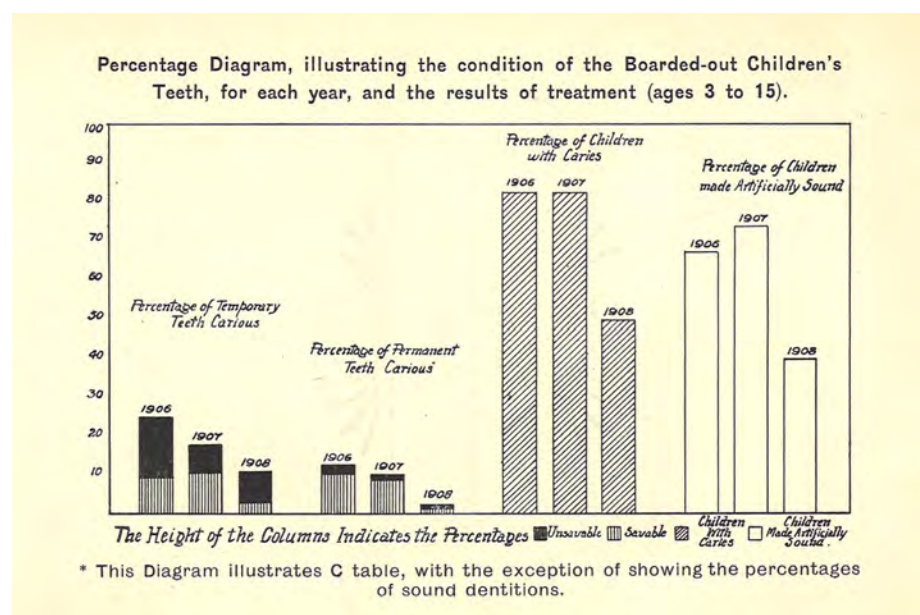
Some children were uncontrollable, thereby preventing treatment. Dr Cunningham devised a measure to encourage co-operation. Prizes were given for courageous behaviour in the chair in the form of 1st prize of 3d, 2nd prize of 2d and third

prize of 1d. This proved to be successful.

The second examination was carried out in 1907 with 55 children attending (34 girls and 21 boys). 41 dentitions were rendered artificially sound. All children that had previously been issued with toothbrushes had used them, with the exception of only one. In addition, it was noted that the children were less anxious regarding treatment.

The third examination, in 1908, was carried out on 55 children (35 girls and 20 boys). Their oral condition was greatly improved and new toothbrushes were issued. The percentage of children with carious teeth in 1906 was 83% which was reduced to 49% by 1908 (Figure 3). The

Figure 5 Graphical presentation of the study results Graph p11 of study - Three Years' Periodical Dental Treatment of Boarded-out Children and its results, with Statistics. Bolton: Ferguson & Sons, Ridgway Gates. 1909.



variety of treatments carried out to the primary and secondary dentition are shown in Figure 4.

At the first examination in 1906, 65 children were examined with only 10 having sound dentition. In 1907, 55 children were examined, again with only 10 children having sound teeth. However, their oral condition was cleaner and healthier and fewer teeth were unsavable. The third examination, in 1908, demonstrated a conspicuous improvement in the children's dental health with 28 out of 55 having sound teeth. The graph (Figure 5) illustrates the benefits apparent in Goldman's treatments.

An example of improved dental health can be seen in William Smith. Aged 13 years and 6 months in 1906, he had 16 sound permanent teeth and 4 unsavable ones. This boy was uncontrollable and no treatment was carried out. However, the following year he returned for examination and he had 19 sound and one savable tooth and was no longer uncontrollable. In 1908 his permanent dentition of 22 teeth were sound and his oral hygiene was acceptable.

Conclusion

At this time, the nation's oral health was poor. The Boer War/South African War (1899-1902) had drawn attention to this issue. Army recruits had been rejected or invalidated home on account of their dental health. At home, working days were lost due to toothache and general health was impaired owing to inadequate mastication leading to digestive issues. 30% of children's ailments, in normal healthy circumstances, were attributed to dental conditions and resulted in irregular school attendance. Armed with the results of Goldman's study, Cunningham was able to argue for the need for children to be able to access dental treatment in order to prevent problems later in life. Goldman's work was an important contribution on the road to providing school dental clinics.

Acknowledgements

The author would like to thank Rachel Bairsto and Helen Nield for their help and information from the BDA museum and library archives.

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- ⁴ Goldman H. *Three years' periodical dental treatment of boarded-out children and its results, with statistics*. Bolton: Ferguson & Sons, Ridgway Gates, 1909
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Author biography

Fiona Gray qualified UCH 1978 and is a retired dental practitioner and BDA museum volunteer.

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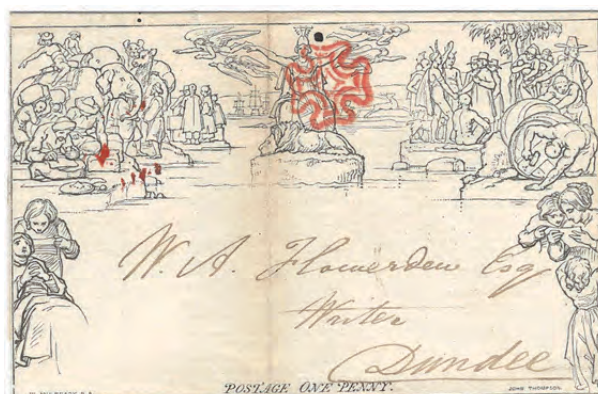
Junk mail in the 1840's - some examples of early dental advertising

Stuart Geddes

Introduction

Until 1840, posting a letter in the British Isles was an expensive business, the charges being based on the number of sheets of paper and the distance that the letter was going to the addressee. As an example, a letter from Bristol to London in the early 1830s would cost tenpence, about ten pounds in today's value. Consequently posting letters was something that only wealthy people or businesses like solicitors would do, and even then it was usually the recipient of the letter who paid the charges. All that changed in 1839 when, as a result of public lobbying, a charge of four pence for a letter to a destination anywhere within the British Isles was introduced. This was popular and the volume of mail increased so much that in January 1840 the charge was further reduced to one penny. There was, however, a problem. As the volume of mail increased quite dramatically and as it was rarely prepaid by the sender, this led to postmen having to collect much more money when they delivered the item. The answer was to introduce some means of prepayment for letter writers to use and to provide more places where letters could be posted into the mail system, such as a post office or later from around 1850, a post box. The result was the introduction of adhesive labels that could be bought at post offices and affixed to letters by the writers. So the Penny Black and Two Penny Blue labels were introduced in May 1840.

Figure 1- Mulready lettersheet sent to Dundee in 1840

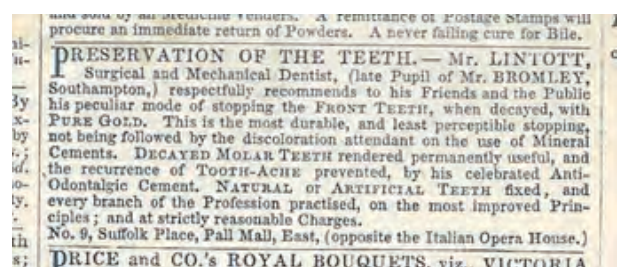


At the same time as the post office introduced stamp labels it also introduced lettersheets and envelopes which could be bought in post offices at a small premium over the cost of the postage. The lettersheets could be folded in and sealed which ensured that the contents remained confidential. Both lettersheets and the envelopes were printed on one side with a design by William Mulready, a renowned artist of the time. The design was complex and not understood by the public (Figure 1) Depicting Britannia with her shield and a lion at her feet, surrounded by representations of the Empire it was ridiculed by the public. Sales of the lettersheets and the envelopes diminished and as a result of the continuous criticism, there were no further printings and they were withdrawn from sale at the end of 1841.

Opportunities for advertising

But, uses other than for personal correspondence, were found by a number of commercial printers who bought the letter sheets and printed the obverse with advertisements from businesses to whom they had sold space. Amongst these were the 'Envelope Select Advertiser' and 'Jell's General and Commercial Envelope' both printed in London and the 'Edinburgh Envelope Advertiser' printed in Scotland. They were usually printed and mailed out to subscribers in editions of around 5000, so very few now exist.

Figure 2 One of Mr Lintott's advertisements.



There is a wide ranging selection of advertisements in these letter sheets, most of which would today be called 'junk' mail but included amongst the advertisements for insurance companies, gentleman's outfitters and patent medicines there are some for toothpaste, toothbrushes and dentists.

Dentists

In the examples that I have in my collection four dentists feature, three of whom practised in London. Their advertisements might have been of little use to people living in the areas outside London to which some of these sheets would have been sent. However, they might still be tempted by other offers.

Mr Lintott who practised in Suffolk Place placed advertisements in two issues in June 1840. In one (Figure 2) he says that he uses pure gold stoppings for front teeth and his 'anti-odontalgic' cement in posterior teeth. He also advises that he practices every branch of his profession and his charges are reasonable. In his second insert (Figure 3), he lays out his charges and goes into more detail about what he does including orthodontic treatment for children, and offers a discount to members of a family.

However, Mr Lintott had competition in the first issue from Mr Moggridge (Figure 4) who offers 'A Saving of 20 Guineas' and thanks gentry and nobility for using his services as well as deriding his profession as 'Abounding with Pretenders and Imposters'. That may well have been the case as at this time there was no regulation of who could do what to anyone. Mr Moggridge, however,

seems principally to be a prosthetist who made his own artificial teeth 'warranted never to decay' and fitted them, a new complete set costing twenty guineas.

Mr Clark, who had a practice in Piccadilly was 'late Assistant to Mr Cartwright' (Figure 5). Mr Cartwright was a very well know dentists of the period. He also practised in London and was noted for his ability to see around one hundred patients in a day. His fame spread across the Atlantic and he was awarded an honour by the Baltimore Dental School, the oldest dental school in America.

Mr Clark uses his Anodyne Cement to restore decayed teeth as his product excludes air and moisture, 'the most prevalent cause of Tooth-ache'.

Other advertisers

It wasn't just dentists who advertised in these letter sheets. The Reverend Gorman Gregg offered to permanently cure tooth-ache, ear-ache and tic-doloureux by the use of Gregorian Paste (Figure 6). He warrants that he made this discovery after many years of an excruciating tooth-ache and knows that, after many years of use, it works instantaneously.

'The Anti-Odontalgic Dentifrice' (Figure 7) features in the same edition as Mr Lintott and is a good example of oral health education in 1840 for it advises regular use so that tartar is prevented from forming, gums are healthier and the mouth doesn't have an unpleasant taste. The paste should be used morning and evening but brushing with a moderately hard brush would not be

Figure 3 Another of Mr Lintott's advertisements.

N.B. All costs must be paid for when ordered.

THE PROGRESS OF DECAY ARRESTED, and LOSS OF TEETH PREVENTED.			
MR. LINTOTT, Surgical and Mechanical Dentist, No. 9, Suffolk Place, Suffolk Street, Pall Mall East, respectfully offers his Professional services on the following moderate terms:			
Cleaning and scaling	£0 10 6 to £1	1 0	
Stopping in pure Gold	—	0 10 6	
Stopping in Cement	—	0 5 0	
Removing carious portion of a Tooth	0 5 0	0 10 6	
Extracting	0 5 0	0 10 6	
A Tooth engrafted	—	1 1 0	
A single Tooth mounted in Gold	—	2 2 0	
Each succeeding Tooth	—	1 1 0	
An entire set of Artificial or Natural Teeth mounted in Gold or in Ivory	10 10 0	31 10 0	
Half sets in proportion			
Regularity of the Teeth in Children ensured, or restored, Scurvy of the Gums effectually cured; and Loose Teeth rendered firm.			
N.B. Two or more members of a Family seeking the aid of a Dentist, are respectfully informed, that a considerable reduction from the above charges will be made in their favour.			
No. 9, Suffolk Place, Suffolk Street, Pall Mall East.			

Figure 4 Mr Moggridge.

TEETH.—Old Burlington Street.—A Saving of 20 Guineas.

For LOSS of TEETH consult Mr. MOGGRIDGE, who, during the present season, has succeeded in above one thousand cases, and in numerous instances where other members of the Profession had entirely failed. Mr. Moggridge, in returning thanks to the nobility and gentry for the decided preference they have shown to him as a Practical Dentist, in a Profession so abounding with Pretenders and Imposters, amongst his many Improvements invites them to inspect his newly discovered Mineral Teeth, which are so firmly constructed as to be impossible for them to break off; they are, at the same time, so beautifully moulded to nature, as to defy even the Profession to detect them from the natural ones; and above all, warranted never to decay, or become the least offensive to the wearer; and, to convince the Public of the extent of his practice, quantities of sets and partial sets, in all stages of progress, may be seen. A complete set of natural Teeth, beautifully mounted in Artificial Gums, of most exquisite Tint, 10 Guineas; a complete Set mounted in fine gold, 10 Guineas; a complete Set of the New Mineral Teeth, of any Shade or Colour, 20 Guineas, the same as charged 40. Mr. Moggridge, Surgeon-Dentist, 13, Old Burlington Street, formerly Pupil, Sole Designer, and Maker of Artificial Teeth for 10 years to Messrs. Parkinson.

N.B. All Consultations free.

recommended today. The same advertisement also mentions Botanic Tincture as a mouthwash.

Hallet's toothbrushes seem to be a marketing triumph (Figure 8). WH, the manufacturer, thanks his customers in the Envelope Select Advertiser for immense increase of patronage for his toothbrushes 'from which the hair never comes out'.

In Scotland the tone of oral health education in the 1840s is different. In October, the Edinburgh Advertiser carried an advertisement headed 'Brushing The Teeth an Absurd and Highly Dangerous Practice' (Figure 9) Dr Allison's celebrated tooth solution does away with the need for brushing with a variety of different products, all of which he condemns. Dr Allison may be correct

in this as he has a variety of medicines and is always prepared to give advice 'honourably and without charge'.

Author biography

Stuart Geddes BDS MGDSRCSEd. Long-time retired from practices in Monmouthshire and the Forest of Dean. He now spends his time in his garden or, when the weather is not too good, with his serious Welsh Postal History collection and his accumulation of postal items with a connection to dentistry. He is a Fellow of the Society of Postal Historians and does occasionally give displays

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Figure 5 Mr Clark

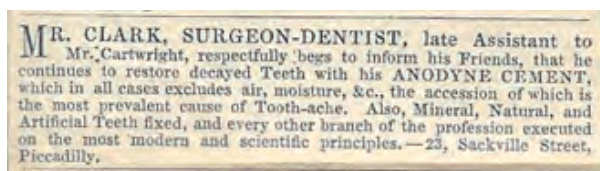


Figure 6 Reverend Gregg

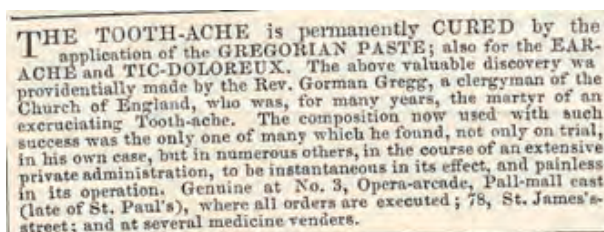


figure 7 An effective toothpaste

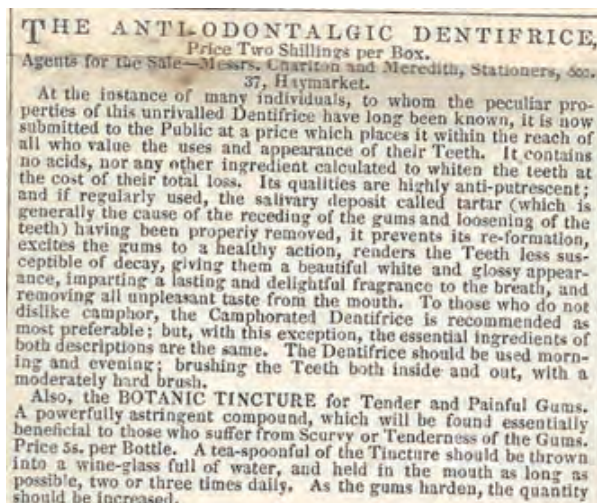


Figure 8 Hallet's toothbrushes

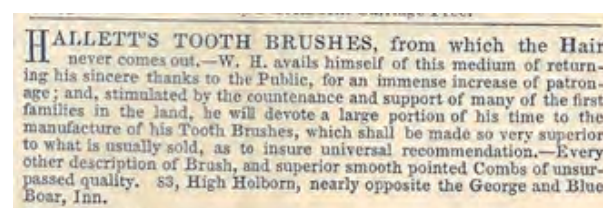
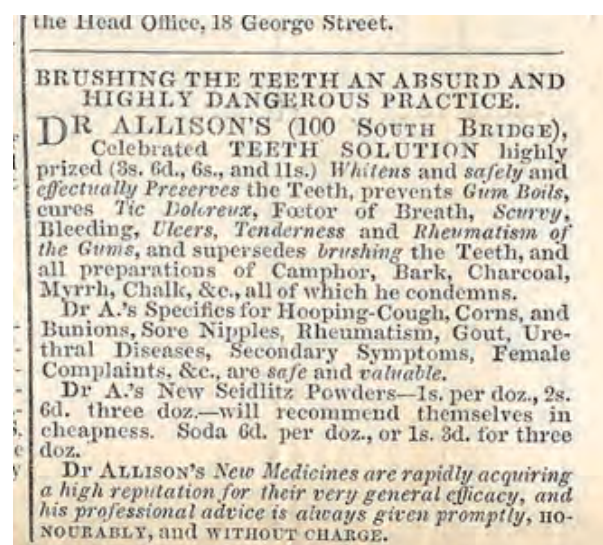


Figure 9 Allison's Medicines



Book review

Aspects of Dentistry in the UK 1948-2012 - the abridged John Maclean Witness Seminars

Wilson,N and Gelbier,S (Eds)

The Museum of the British Dental Association (2025)

ISBN: 978-1-0685627-0-9

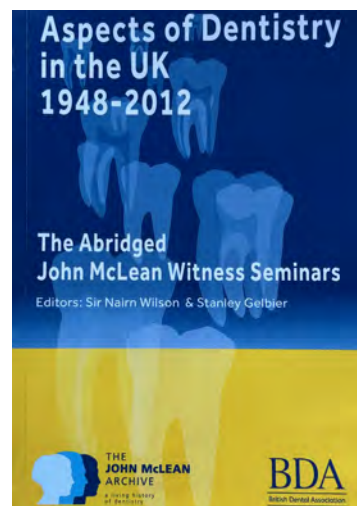
As a piece of oral history, this book has much to commend it. These abridged transcripts of seminars which took place in 2012 were published in full in 2014, but this 255 page summary is a useful addition to the history of dentistry. Covering 5 topics – the regulation of the profession, changes in dentistry since 1948, the role of dental care professionals, the development of dental biomaterials and the dental press – the seminars brought together some of the luminaries of the profession over the latter decades of the period. Chaired by the editors, each seminar provides an overview of the past as the attendees recalled it, or experienced it or, in some cases, heard about it from a previous generation.

Each section has clearly been led off by a pre-prepared paper from someone with personal experience of the topic – Margaret Seward for the GDC, Mike Grace for the dental press, for instance - and what follows are the verbatim words of the contributors, some with short interjections, others with longer contributions, with the chair prompting the forward movement of the discussions. To me (UCH, London 1967-1971), the descriptions of the highs and lows of the NHS dentistry are particularly poignant. The huge numbers of extractions – ‘in one afternoon in 1970, I extracted 238 teeth’ said one participant – and the changes to treatment influenced by the NHS fee allowed – ‘whenever an item of fees increased there was an epidemic of the condition requiring treatment’ – are statements which might surprise or even shock readers of the future.

For my generation, this is a probably a nostalgic read. There are names from my undergraduate days – Arthur Prophet, the Dental Dean at UCH; from my early days in practice – AE Brownjohn (how many letters arrived each morning from the Dental Estimates Board, with his signature stamp, telling me I had failed to complete my EC17 correctly?); Robin Basker, who took my Master’s viva; Stephen Hancocks, my editor at the BDJ - and many more. However, to remove any rose-tinted views I might have, I asked a young dentist for her opinion of the book. She (BDS QUB, 2018) said this

“For those of us with no previous interest in dental history and without our own memories of the events discussed at these seminars, we may have little reason to consider how dentistry in the UK came to be as we find it today. For example, I simply accepted that the GDC comprised of 6 registrants and 6 lay members, with no thought for the processes by which it arrived at this. For young colleagues considering leadership roles within the profession, I would recommend this book for an understanding of the road travelled, so they can say, at least through the eyes of others, “we’ve been there and done that before.”

Inevitably, in a self-published book like this, there are some niggly spelling errors and inconsistent formatting, but they do not detract from the purpose of the text. What could have been of great benefit to future readers would have been a brief biography of all the participants alongside their photographs. Despite this, the book achieves the editors’ aim to ‘provide a valuable, initial source of reference to dental historians of the future.’



Papers from other places

Linking ethics to historical objects

Critical retelling of dental ethics told through ‘George Washington’s complete denture’

Eleanor Fleming and Patricia Neville

Medical Humanities (2025) doi:10.1036/medhum-2024-013151

George Washington’s dentures are perhaps the most famous set of false teeth in the world. Constructed from ‘human bone, hippopotamus, ivory, lead, brass screws and gold,’ they are in the care of the Mount Vernon Museum in Virginia, USA. Deconstructing the object, the authors connect it to history and its context within colonialism, biopolitics, whiteness, power and racial capitalism. For example, the source of the teeth used in the making of the denture is unknown but there is evidence that Washington purchased teeth from enslaved people. Thus, despite Washington’s reputation as a model of honesty and integrity, the object reminds us that Washington enslaved hundreds of people in his lifetime and refused to use his political power to condemn slavery during his presidencies. Other ethical dimensions of the dentures are examined in the paper and whilst the authors acknowledge that they are not historians, they hope that ‘this work inspires practising oral health professionals to learn more about the profession and its histories from those individuals and organisations that preserve the profession’s history.’

An insight into transatlantic dental education

The influence of the University of Pennsylvania on UK dentistry 1880-1922

Chris Stephens

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With the slow development of dentistry as a profession in the late Victorian period, educational institutions began to offer examinations to establish practitioners’ credentials. Although not compulsory for registration, many chose to sit examinations set by the Royal Colleges of the United Kingdom. Two American universities (Harvard and Michigan) also offered registerable qualifications. Apparently, the University of Pennsylvania (UPenn) also applied to provide such qualifications but for reasons unknown, was refused recognition by the Dental Board of the United Kingdom. In excess of 100 dentists travelled to the USA to attend UPenn and by 1916, one UPenn graduate was able to register the qualification in the UK. The reason for the popularity of UPenn is not known but the influence of Matthew Cryer (of elevator fame) and Theodore Smith who had contacts in both Liverpool and Manchester appears to be relevant. Many who returned to the UK with the post-nominal DDS (UPenn) went on to have distinguished careers in teaching, academia and as officers of the British Society for the Study of Orthodontics and the BDA but the reasons for the popularity of UPenn as an educational destination is not clear.

An early example of women in dentistry

Mademoiselle de Rezé– the first female author of dental remedies – Dissertation Apologétique des Remèdes – 1719

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Fauchard's *Le Chirurgien Dentiste* is famously recognised as a foundational work of dental knowledge. Published in 1728, he was, however, beaten to publication by Mademoiselle De Rezé's work *Dissertation Apologétique des Remèdes* (A Humble Treatise on Remedies) by 9 years. Published in 1719, followed by a second edition in 1722, her text on health remedies included treatments for toothache, gingival ulcers and bad breath. Little is known about the author – she has a name originating in Brittany in north west France – and she lived in Paris within walking distance of Notre Dame. Her ability to cite current physicians whose works were in Latin, the ability to read and write in German and Italian, a knowledge of medicine, botany and chemistry and her connections to the French royal court suggest she was a woman of some education and social status. Her remedies included a balm for toothache – dental decay she attributed to acid and tooth worms – and a solution for herpes, which she correctly identifies as infectious and its potential to spread through sexual contact. Mademoiselle de Rezé was actively publicising her remedies until 1746. The paper includes an English translation of the 1722 edition of her book.

100 years ago

London Daily Chronicle - Wednesday 30 September 1925

The Dentist.

The many contrivances which may be seen at the International Dental Exhibition may prove instructive to the dentist and impressive to the layman; but the latter has generally better means of forming an opinion of the great advances made in dental surgery in recent years. He knows it either from his own personal experience, or from the experience which his elders will readily describe to him, A visit to the dentist today is generally not much worse than a test of patience. Twenty years ago it was a test of physical endurance. We can all judge the marvellous effects of a local anaesthetic in avoiding pain. But this is really a small part of the advance in knowledge which enables dentists to anticipate and avert trouble, to mend, strengthen and reconstruct the dental system in the mouth. Most remarkable of all, perhaps, is the use of X-ray photography for revealing the secrets of the teeth, and enabling the dentist to treat defects which his eye cannot see.

Every educated person is now aware of the fact that defective teeth are a sure cause of ill-health, and that to neglect them is to invite illness. This is a truth which sometimes is, and always ought to be, thoroughly driven into the minds of children in the elementary schools. It would undoubtedly have a very great effect upon the national health if dental services were provided under the Health Insurance Act. Some of the Approved Societies, as Mr Forrest Bowen has been pointing out, are now giving dental benefit out of surplus funds. As it is, far too many people never visit a dentist until they have toothache.

Afterwords

Social media today is full of the woes and moans of being a dentist - particularly in general practice. There's the curly rooted endo, the failed extraction, the difficult patient as always, but add to that, the negative Google reviews, the threat of litigation and an unsatisfactory dental contract. It can be a hard life. Was it any easier in the past? Here's a poem from the BDJ in 1925 titled

The Dentist (or the Lament of Johnston)

*A dentist's life is hard to bear,
He ne'er becomes a millionaire
He warks contorted ower a chair
On human jaws
Deprived o' pleasure and fresh air
Within four wa's.*

*From worry he is never free,
Although as careful as can be,
Wi' root canals - oh mercy me!
And bad extractions,
And patients quarrelling ower his fee
And raising actions.*

*The depots now they charge him high
For a' the goods he has to buy
They never heed his humble cry
And heartfelt prayer
To get the things that they supply
At prices fair.*

*The B.D.A. as I'm alive
Instead o' helping him to thrive,
At his undoing maun contrive
For by their actions
The set he makes for three pounds five
Includes extractions.*

*He has to try a' kind of wiles
To cure neuralgia and gumbiles
And sets up teeth in various styles
And various shapes
To renovate the toothless smiles
Of toothless apes.*

*Although he is a 'priceless boon'
He maun extract for half a croon
He may as well sigh for the moon
As just reward
The maist kicked man in a' the toon
And mist abhorred.*

*I'd rather start and muck a byre
Or drive doon cattle fae Strathyre
Or at a pair of oars perspire
Or act as ghillie
I wish to God I could retire
I'm near driven silly.*

For the full effect, try reading the poem aloud in a Scottish accent! We don't know anything about poor Johnston but 100 years ago, he was, perhaps a little tongue in cheek, writing of the realities of general practice in his day. The same struggles are all there - a contorted spine, the blinkered life, root canals, extractions, the moans about his fees, the threat of legal action, the price of materials and the patients' expectations of instant cure and the perfect smile. On top of all that, the BDA had just negotiated a contract with the approved societies for him to provide dentures for a fee which included any necessary extractions!

Sometimes he is the 'priceless boon', everyone's favourite and at other times, the most hated man in town. He longs for the fresh air, the physical labour of the outdoor life and retirement.

Plus ça change, plus c'est la même chose.

Submissions to the Dental Historian

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Please submit papers for consideration for publication in the Dental Historian to Paul Hellyer at editor@lindsay society.co.uk. Work submitted for publication must be original, previously unpublished, and not under consideration for publication elsewhere.

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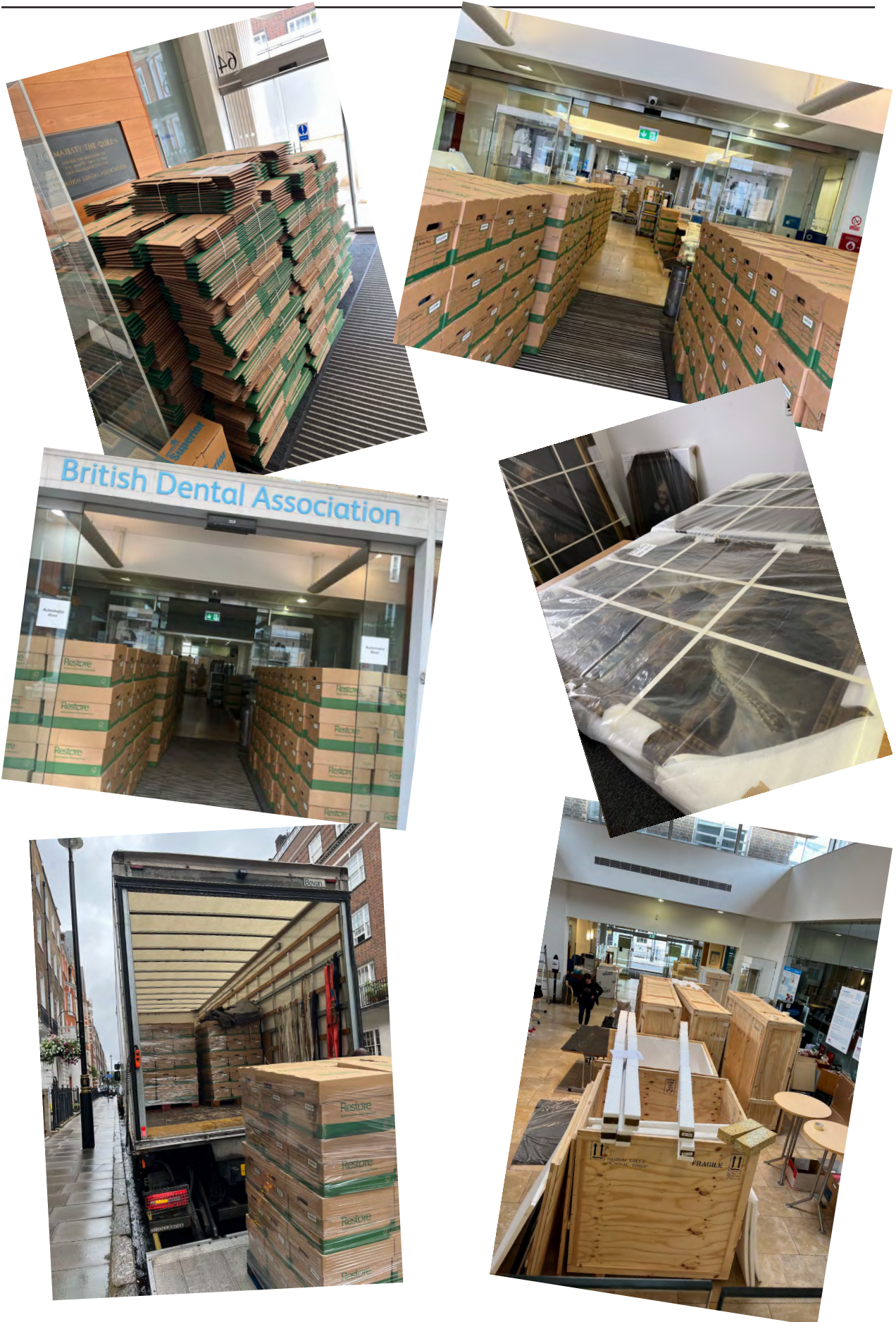
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Leaving Wimpole Street - the end of an era

