

## DENTAL TREATMENT BEFORE 1850 - HOW EFFECTIVE WAS IT?

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In this paper I would like to look at some of the treatments offered by dentists in the period from 1750 (when dentistry began in this country) to 1850 and speculate on how effective they may have been.

There are relatively few contemporary accounts of dental treatment of the period and even fewer accounts of their success. Those reports arising from patients are anecdotal, whereas those arising from the dentists suggest either perfect, or very unsatisfactory results, depending on whether they, or some other dentist does the treatment.

It must be remembered that anaesthetics were not available in the early period. Treatment had to be quick and as painless as possible. This, together with the inferior lighting available, must have affected the thoroughness with which the operator could have done his work, even if it were based on sound mechanical principles. However, just because an operator was working 150 - 200 years ago one must not fall into the trap of believing that he was an unsophisticated, ineffective dentist peddling useless treatments and inflicting untold harm.

### Filing of teeth

Where decay attacked the point of contact between two teeth, it was common practice to file away these contact points and, if the decay had not penetrated too far, hopefully eliminate it altogether. Frequently this was undertaken for prophylactic reasons. In both cases care was taken to finish with fine files to leave a smooth surface, and patients were instructed to polish the surfaces with bamboo sticks.

The result cannot have been aesthetic. Ugly gaps would be left between the teeth, it may not be possible to remove all the decay, and it is

highly likely that the exposed dentine of the tooth would not only be extremely sensitive to hot, cold and sweet foods, but would also become stained. There was the additional hazard of recurrent decay, especially in those cases where the teeth had drifted together again. In other words, this was not a very satisfactory technique, despite being very widely used.

### Fillings

By the early 19th century several authors were deprecating filing of teeth for these very reasons and advocated filling or 'stopping' of teeth. Where the biting surfaces of the teeth were decayed, this was the only treatment available anyway (apart from extraction). There were, of course, severe limitations on what could be done because of the poor instrumentation and materials then available. When access to the cavity was difficult (eg between the front teeth), elastic bands or small pieces of india rubber were inserted for a few days previously in order to separate the teeth. Care was taken to remove all the decay from the cavity using 'spoons' (what would now be called excavators) and finger-held drills. Pure, soft gold was the most favoured material for the filling, and when thoroughly condensed into a well prepared and dried cavity, was likely to give a highly successful result. There are reports of these fillings lasting 40 years or more. This technique, with minor modifications, continued to be used until modern times and only relatively recently ceased to be taught in Dental Schools.

The technique was expensive, so there was a constant search for cheaper materials. Silver, platinum, lead, low melting point alloys and 'mineral pastes' were all used but none was as satisfactory as gold. The problem was that they had a different co-efficient of thermal expansion from the tooth, so they expanded and shrank with changes of temperature, they leaked around the edges, corroded and either wore away or eventually fell out. The first amalgams of silver-mercury began to be developed in the early part of the 19th century. They were called 'succedaneum', meaning literally 'artificial substitute'. Use of this material was promulgated

in the States by a rather disreputable English dentist named Crawcour. Its use was discredited; all members of the American Society of Dental Surgeons had to sign a declaration not to use it or be expelled, for it was considered that no amalgam could ever be as good as gold. By 1856, however, the American Society had lost so many members it could not make a quorum for its annual meeting and became virtually bankrupt. The increasing success of amalgam must have been a factor in this, but it was many more years before amalgam became generally acceptable filling material and its use only rivalled gold by the end of the century.

### Pivot teeth

If a tooth was badly broken down, neither filing or filling would be possible. In these cases a metal or wooden post (or 'pivot') was inserted into the remains of the root, to which was attached an artificial or natural tooth. The nerve of the root was destroyed, partially or completely, by cauterization with hot wires, arsenic, or by mechanical means. No attempt was made to completely fill and seal the root canal as would be considered essential now. Consequently, such teeth must have been prone to infection. Some operators advocated cutting a groove along the pivot, designed to allow pus to drain away. However, it must be said that to this day, many patients unknowingly have infected root canals, and a high proportion give little or no trouble.

With poor cementing materials, many of these pivot teeth (or post crowns, as they would now be called) must have become loose. Also, when wooden pegs, usually hickory, were used, swelling of the fibres would often have caused disastrous splitting of the root.

### Extractions

A tooth decayed beyond redemption might be extracted, usually by means of a key or pelican. The design of both these instruments was such that tooth was literally wrenched sideways from its socket. Where a tooth was

already loose, the result would usually be successful but, when the tooth was badly decayed or too firmly embedded, there would undoubtedly be complications. For example, it is very possible for the tooth to break off at the level of the gum. If this occurred, removal of the root would be so difficult and painful that in most cases it would be left and hence be susceptible to the sort of infection already mentioned in connection with pivot teeth. On the other hand, the tooth was sometimes removed together with a portion of its supporting bone and gum. Sometimes two or three teeth were accidentally removed with the intervening bone. If a significant portion of the surrounding gum became torn in the operation, post-operative haemorrhage would be profuse.

By the early part of the 19th century extraction forceps were being developed. These accurately fitted the necks of the teeth, so that the teeth could be firmly gripped. This permitted the tooth to be rocked and rotated in any direction, so that its attachments to the bone were loosened prior to its final removal from the jaw. It is interesting to note that the design of extraction forceps has undergone very little change in the last 140 years.

### Transplantation

The transplantation of teeth from the impecunious to the rich was a short-lived vogue in the late 18th century. It was widely advertised and perhaps frequently attempted. In many, if not most cases, the attempts would be doomed to early failure, but there are reports of such teeth being firmly retained for periods up to a month.

### The treatment of periodontal disease

Our professional predecessors were well aware that periodontal disease often resulted from unclean teeth, even though they were ignorant of the precise aetiology and pathology of the various conditions. They laid great stress on toothbrushing and the need to scrape the tartar from tooth

surfaces. If this were done carefully, there is no doubt that a dramatic, but temporary improvement in the health of the gums would have resulted in many cases. Other treatments inflicted on the unfortunate patients were scarifying, and/or the application of leeches. It is difficult to see what beneficial results could ensue from scarification. The series of superficial incisions which it caused may have permitted the drainage of pus, if present, and may have allowed the temporary reduction of tissue swelling but it seems far more likely to have caused considerable trauma and even further inflammation.

As for the application of leeches to the gums, this must have been a most unpleasant experience for the patient. The greatest benefit would have been from the placebo effect. The relief of having the leeches removed from the mouth, engorged with the blood and possibly pus must have been considerable, and created a vivid impression on the patient. Any physiological effect would have been minor, and the risk of them transmitting infection considerable.

The ligation (or tying together) of loose teeth was frequently carried out. This was done with wires or silk but in both cases the ligature would be prone to collect more plaque, as well as to work its way down the roots of the teeth. In the short term, no doubt the patient would be pleased to have the loose teeth stabilised but in the long term such procedures would do more harm to the gums than good.

### Dentures

It was his ability to produce dentures which identified the true dentist, separating him from the common tooth drawer. It required great skill to make even a moderately functional or aesthetic denture, given the materials available at the time. Dentures were made to replace one missing tooth or any number up to a complete set. Beeswax impressions were taken of any existing teeth and jaws. Early in the period, no trays were used to support the wax, so distortion must have been considerable, leading ultimately to an ill-fitting denture. By the 1840s, impression

trays existed which were very similar to the ones used today. Casts of the jaws were made in the impressions using plaster of Paris, lead, or 'spelter' (a metal alloy based on zinc). The entire base was made of either gold which was hammered to the shape of the cast or, alternatively, it was carved from the teeth of hippopotamus or walrus until it fitted the model. This must have been a long tedious process, often delegated to the apprentice. Teeth, either human or porcelain, were fitted to the gold or ivory bases by a variety of ingenious means depending on the type of teeth used, but loss of individual teeth would be a frequent occurrence. Where the patient still had some remaining teeth, the denture was held in place by metal clasps or silk ligatures. When no natural teeth were present, gold spiral springs were often used to join together the upper and lower denture. The finished result was almost certainly very uncomfortable, and most likely caused ulceration of the gums and cheeks if worn for any length of time. Most dentures were therefore almost exclusively worn for aesthetic reasons, and removed prior to eating.

Despite the claims of dental advertisers, such dentures must have had a very unnatural appearance, even when new. The cochineal dye sometimes used to simulate the gum only lasted a few hours. The ivory base would soon become malodorous, and together with any natural teeth, be subject to decay. The production of porcelain teeth and enamelled gumwork obviated some of the deficiencies, but it was some time before they became aesthetically acceptable replacements for natural teeth.

Dentures were often fitted over retained roots. Advertisements assured potential patients that it was not necessary to undergo the ordeal of extraction before artificial teeth could be fitted. This would, of course lead to the same pain and sepsis described earlier.

### Orthodontic treatment

The orthodontic techniques of the late 18th centuries had many similarities with present-day procedures, both in objective and method. They aimed to correct overcrowding, narrow arches and malpositioned teeth.

In many cases the results would be successful. Appliances of ivory or gold were carefully designed so that forces could be applied to the teeth with wire or silk ligatures. Bite planes were used to separate the teeth of the upper and lower jaws so that teeth could move and also to direct teeth into their new positions, much like their modern counterparts. The need to remove appliances daily for cleaning and for the retying the ligatures was stressed.

Frequently, however, the necessary degree of expertise was lacking. Bell criticised operators for extracting deciduous teeth too early, actually promoting the crowding which the procedure was designed to prevent. Teeth were filed, often excessively, to relieve crowding, with the harmful effects described earlier. So routine was this practice in the 1830s that Gray stated that children at boarding schools were having their teeth filed without prior knowledge of their parents, 'their first information on the subject being derived from the item in the bill for the school-charges'.

### Conclusions

Inevitably in an assessment of this kind, some generalisations and assumptions must be made. Some dentists were mere charlatans and left a trail of damage and sepsis. The materials available, were in many instances woefully inadequate for the purposes they were intended to serve. On the other hand, some dentists were highly skilled and applied their knowledge with great care. They inserted high quality fillings, extracted teeth with the minimum of trauma (at least when forceps replaced the key), were able to perform quite complex orthodontic treatments and were able to provide fairly aesthetic, if not functional dentures by the early 19th century, when porcelain teeth became available. All treatment,

however, must have been at least uncomfortable if not extremely painful and the amount of residual infection left in patients' mouths, considerable.

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