RESTORATIVE DENTISTRY: TREATMENT OF CONGENITAL AND ACQUIRED ABNORMALITIES

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Restorative dentistry is a specialist branch of dentistry that includes the following specialities:

- periodontology (treatment of the periodontal supporting tissues, gingivae, and alveolar bone)
- endodontics (treatment of the dental pulpal tissues which will include 'root canal treatment')
- fixed and removable prosthodontics (dentures, crown and bridgework)
- dental implantology (titanium implants that are placed in bone and then support crowns, bridgework or dentures)
- special care dentistry (patients who have a medical history that affects their dental treatment).

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the functional, psychological and aesthetic requirements of the individual patient including the coordination of multi-professional working to achieve these objectives’.

Patients may have a variety of problems: many have complex restorative dental problems that require diagnosis or advice and treatment planning, others may be medically compromised and yet others have congenital oral and facial defects, dental abnormalities or acquired facial defects. This last group of patients will often require a multidisciplinary approach for treatment planning with orthodontic and oral surgical colleagues. In this article I would like to discuss some of these problems and give a few clinical examples.

Restorative dentistry is defined by the association of consultants and specialists in restorative dentistry as ‘the study, diagnosis and integrated effective management of diseases of the oral cavity, the teeth and supporting structures and the rehabilitation of the teeth and the oral cavity to

CONGENITAL ORAL AND FACIAL DEFECTS

Cleft lip and palate

The incidence of cleft lip and palate per head of population in the United Kingdom is 1 in 700. A team of clinicians and healthcare workers sees and treats affected individuals from birth. There are plans to centralise the cleft services to a few sites where expertise will be concentrated.

The restorative dentist may be involved at an early stage, but more usually sees the patient later, such as at the time of alveolar bone grafts at about the age of ten to fifteen as the canines erupt. This is to help with the planning of future orthodontics and oral surgery. The final treatment by the restorative dentist may only be to replace one or two missing teeth, or may be a great deal more complicated.

If the pre-maxilla is mobile, or the teeth are unstable, then conventional fixed bridgework may be necessary to stabilise the parts. This is less frequent now than in the past due to the placement of alveolar bone grafts by the maxillofacial surgeon. Conventional fixed bridgework, used to replace the missing teeth, can be problematic, as there is a high failure rate over years and preparation of the teeth is generally destructive of tooth tissue. If after orthodontics the cleft has been repaired and the teeth are stable, the introduction of resin bonded bridgework, which is less destructive than the conventional type, simplifies the restoration of missing teeth.

Unfortunately there are patients who still have unrepaired cleft palates due to lack of treatment as a child, particularly if the individual was born abroad. Here the restorative dentist is required to help plan and quite often carry out restorative treatment to allow the patient to eat, drink and talk. Understandably, unrepaired cleft palates make speech difficult to understand if not obturated and food and liquid can pass through the cleft to the nose. Sometimes further surgery can be undertaken; this is often dependent on the patient's age, health, amount of soft tissue available and their expectations. Otherwise, a denture that obturates the defect and also replaces any missing teeth is the treatment of choice.

Open-ended defects of the hard and soft palate may require a prosthesis constructed with an additional speech bulb to allow improved speech that the restorative dentist will have to design.

Figure 1 shows a patient who has an unrepaired cleft. The patient was in her 40s and had lived most of her life in Kenya

Figure 1

and had not had surgery done on her cleft. She was wearing an upper partial cobalt chrome denture, which required replacement as it had become loose. The technique for impression-taking for such a patient has to be done carefully so that the impression is taken accurately but does not tear or get lodged in the cleft so that it cannot be removed. The denture design is critical: ideally one wants the best aesthetics but also one which functions well, not allowing fluids up the nose, and which does as little damage as possible to the remaining teeth. It is important to keep the existing teeth, as these then will maintain the alveolar bone and this, with the teeth, will provide support and retention to the denture, so preventive dentistry is of great importance. As this patient had previously worn a denture it was also important not to change it too much so that her speech would not be too badly affected.

Amelogenesis imperfecta

Amelogenesis imperfecta is a genetically determined enamel defect, which usually affects both the primary and secondary dentition, and is not associated with generalised disease or syndromic abnormality. Three principle types have been described according to their clinical appearance: hypoplastic, hypocalcified and hypomature. In the hypoplastic type the defect is basically in the amount of enamel matrix formed, whilst in both other types the defect is principally a deficiency of mineralization.

The main signs and symptoms of patients affected with amelogenesis imperfecta are related to the inadequate quality of enamel. The patient generally describes a poor appearance and a tendency of the teeth to wear. The patient may also complain of thermal sensitivity.

The restorative dentist generally gets involved with the patient as the permanent dentition erupts. Restoration of the dentition is reasonably straight forward as the dentine is sound, so conventional crown and bridgework is possible.

The aims of treatment are:

- to relieve pain and control sensitivity
- to restore the appearance
- to maintain the dentition and try to delay the need for conventional crown and bridgework.

The use of the acid etch technique with composite resin has simplified treatment to restore appearance and reduce sensitivity, particularly in the primary dentition. Preservation of the molar teeth in the primary dentition is usually with stainless steel crowns.

When the adult dentition is reached generally treatment is based on the provision of conventional crown and bridgework. This can be problematic as the crown size and shape are usually smaller than normal teeth and periodontal surgery may be required to increase the length of the clinical crowns in conjunction with raising the vertical dimension to give sufficient retention.

Dentinogenesis imperfecta

This is a hereditary defect of the dentine, which clinically affects both dentitions and is characterized by an opalescent blue or brown discolouration. Patients usually present with problems with their appearance, as the teeth wear very rapidly on eruption. Radiologically the natural crowns tend to be bulbous and the roots thin. The pulp chambers are quickly obliterated by the rapid deposition of abnormal dentine and there may then be evidence of associated periapical pathology. Elective endodontic treatment is not recommended.

The aims of treatment are the same as those of amelogenesis imperfecta. Treatment is, however, often very much more difficult as conventional treatment often does not work as the dentine is so abnormal. Where there has been considerable wear, treatment is often limited to over-dentures.

Early treatment of posterior teeth in the deciduous and mixed dentition cases helps to maintain vertical dimension and subsequent treatment can be made easier.

Figure 2 shows a patient with dentinogenesis imperfecta. The discolouration of her teeth cannot be seen on a black and white photograph, but the extent of wear of the lower anterior teeth can be seen as a direct result of her occlusion. Treatment for this patient was to crown the undamaged posterior teeth to provide posterior support and to make a conventional lower cobalt chrome over-denture. The teeth were not extracted as they allowed the alveolar bone to be maintained and this would be important over the long term, as over time the partial denture would cause resorption of the alveolar bone and make denture-wearing more difficult.

Figure 2

Hypodontia

Hypodontia means congenitally missing teeth. The frequency of congenitally missing teeth varies according to sex, and occurs in about 7% of the population. The tooth most commonly missing in females is the mandibular second premolar, followed by the maxillary lateral incisor, then the maxillary second premolar. In males, the tooth most frequently missing is the mandibular second premolar, then

the maxillary lateral incisor, followed by the mandibular lateral incisors, then the maxillary lateral incisor.

Treatment planning of such cases involves the restorative dentist and orthodontist. Sometimes the missing teeth can easily be replaced restoratively quite simply with or without the help of the orthodontist redistributing the space. With multiple missing teeth the decisions become more complex. Patients with hypodontia also quite often have malformed teeth. These can be disguised reasonably well with composite or porcelain veneers.

Although in the past conventional bridgework or partial dentures might have been the treatment of choice to replace missing teeth, with the current use of dental implants the choice of treatment has increased to the patient's benefit. The distribution of space then has to be planned to give the best aesthetic result in combination with providing sufficient space to allow placement of implants.

ACQUIRED FACIAL DEFECTS

Trauma

Head injury either from physical assault or trauma from other causes, such as shotgun wounds, can affect the facial bones and teeth. Surgery may correct the problems completely, but occasionally there is also hard and soft tissue loss, which results in inadequate repair. The restorative dentist may then have to intervene to try to restore appearance and function.

It would be difficult to discuss this in detail as every patient has to be seen and planned for on an individual basis and no two are the same.

A simple example of such a case is shown in Figure 3, a patient who was in a road traffic accident and fractured the crowns and roots of the upper left central and lateral incisors. He also fractured the root of the upper right central incisor. Conventional endodontics was undertaken to try to save these teeth as they became non-vital shortly after the trauma. This, however, was unsatisfactory as all teeth subsequently developed internal resorption and were eventually extracted. They were then replaced with a temporary immediate denture. They were several options for replacement of this patient's teeth: a permanent denture, bridgework or implants. Implants were possibly the ideal treatment because of the patient's age (early 20s), his unrestored dentition and good oral hygiene and better subsequent aesthetics. Figure 4 shows the end result of a fixed bridge supported by implants.

Figure 3

Therapy for head and neck tumours

The incidence of oral cancer is 5 per 100,000 of the population in England and Wales. Surgery that is carried out intra-orally as treatment for the oral cancer may have profound effects on the patient's ability to eat, drink and speak well. The surgery can be very extensive, taking away large amounts of hard and soft tissue as well as teeth. Sometimes repair of the defects can be undertaken by the surgeon with extra-oral flaps, and repair has improved with the advent of microvascular techniques. The restorative dentist can be helpful in the subsequent rehabilitation of the patient.

Figure 4

Ideally the restorative dentist should see the patient at the initial planning visit, as an assessment of the teeth may be vital if radiotherapy is to also be considered. Advice about the effects of radiotherapy and possible subsequent xerostomia are important topics for the patient to discuss, with advice about diet and other associated problems.

If the surgeon is considering a maxillectomy the restorative dentist can help with the planning and design of the immediate obturator.

Generally an immediate obturator has to be placed immediately post-operatively and is usually removed about two weeks later. This can then be adapted or changed to an intermediate obturator. The intermediate obturator is then worn for several weeks or months while the patient is kept under review. Once the surgeon is happy that the healing has occurred and there will be very little further change in shape of the cavity, then a more definitive design can be made.

Patients who have part of their mandible removed may not require immediate restorative prosthetic help, but may request it later to try to improve appearance and function. Microvascular surgery has helped improve the repair of the defect for the patient, but may make conventional dentures much more difficult to wear. Dental implants have revolutionised prosthetics for the oral cancer patients. There is still a debate as to when implants can be placed, as post-radiotherapy there is a chance that they may fail. Placement of implants varies between different centres and surgeons and of course is dependent on funding. Planning placement of the implants should always involve the restorative dentist, who will subsequently have to use the implants to restore the mouth and the positioning is vital to a good end result.

Figure 5 shows a patient who has had a hemimandibulectomy and radial forearm graft to replace the lost soft

Figure 5

and hard tissue, on the patient's left. This is poor support for conventional dentures, which do not always work. Implants would improve the prognosis of a denture considerably. This particular patient did not want any further prosthetic treatment as he was able to eat well and was not bothered about his appearance because his wife had not complained!

Patients who have had part of their maxilla removed will also have problems with eating and drinking. The problems

involved with impression-taking are similar to those with unrepaired clefts. The patients also need to be seen regularly as the defects change size and shape rapidly in the first few months. In the Morecambe Bay area we have not yet been able to provide this sort of patient with implants, which I hope will change as it would help to rehabilitate these patients more fully back into society.

Implants are also used to hold extra-oral prostheses in place, and in many centres the restorative dentist works alongside the technician to provide these prostheses.

This article gives a limited overview of the type of treatment that a restorative specialist may become involved in when based in hospital dentistry.

FURTHER READING

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