

Current trends in orthodontic treatment

Malocclusion or irregularity of the teeth is not in itself a disease. It is usually the result of mismatch in size of the teeth and jaws or in the relation of the jaws. Malocclusion can also be associated with developmental defects such as clefts of the lip and palate, but in most malocclusions there is no developmental abnormality. For the most part the factors determining malocclusion are under genetic control and so are not preventable. Some environmental factors such as breakdown and loss of deciduous or permanent teeth are of course avoidable, but these tend to complicate rather than to create malocclusions and so improvements in the standards of dental care do not appreciably reduce the prevalence of malocclusion.

Estimates of the prevalence of malocclusion vary quite widely depending on the criteria that are adopted. Although the features of an ideal occlusion can be specified exactly, this is found rarely. The term 'normal occlusion' is used to describe those minor variations from the ideal that are regarded as being functionally and aesthetically acceptable. The subjective element in such a classification means that there may be disagreement about the classification of borderline cases. Surveys generally agree, however, that about 50% of children could benefit from orthodontic treatment.^{1 2}

Malocclusions and dental health

Orthodontic treatment can be justified if it will improve to a material extent the dental health or appearance of the patient. The effects of malocclusion on dental health are not clear cut. In a few circumstances there can be a traumatic relation of the teeth, which can lead to damage to their supporting structures and periodontal disease. Some irregularities lead to a displacement on closure of the mandible, and this can lead to pain and dysfunction in the associated muscles and joints. Irregularities can make teeth more difficult to clean, and accumulation of plaque leads to caries and periodontal disease. The effects, however, are indirect, and adequate oral hygiene measures can control plaque even where there are quite severe dental irregularities.

Most patients seek orthodontic treatment for aesthetic reasons. Many malocclusions are facially disfiguring and thus can have an important impact on the individual's social life and even on their career prospects. Orthodontic treatment is fully justified in these cases. In contrast, many minor

irregularities have trivial effects on facial appearance and do not prejudice dental health. Even if the patient expresses concern about such a minor problem, treatment may not be justified, particularly within the context of the National Health Service.

Orthodontic appliances

Orthodontic appliances are devices designed to apply forces to the teeth in such a way that remodelling of supporting bone is stimulated. They may broadly be categorised as removable, fixed, and myofunctional.

Removable appliances are plates incorporating springs to apply forces to the teeth. They are particularly suitable for correcting simple irregularities where all that is required is to tip the teeth into the correct position. They are not suitable, however, for bodily movement or other manoeuvres that require precise control of the force system applied to the teeth.

Fixed appliances are required for correction of the more complex malocclusions. These comprise attachments (usually of stainless steel) that are fixed to the teeth for the duration of treatment. Flexible wires attached to these brackets can then be designed to generate whatever force system is required. There are a number of different modern fixed appliance systems, but all are capable of detailed control of tooth positions when used by competent operators.

Myofunctional appliances are removable devices that utilise the orofacial musculature to apply forces to the teeth. They can be very effective in correcting anteroposterior malrelations between the lower and upper dental arches but are not capable of detailed control of tooth movements.

Sometimes it is useful to correct gross dental arch malrelations with a myofunctional appliance and complete treatment with a fixed appliance. Claims are made that myofunctional appliances can affect facial growth favourably, but there is no scientific evidence that they can do so to any important extent; and it should be recognised that improvements in jaw relation with growth may occur in the absence of any orthodontic treatment.

Indications and limitations

Orthodontic treatment is often undertaken most efficiently in the late mixed/early permanent denti-

tion stages (between 10 and 14 years of age). Tooth movement in adults is only slightly slower but some malocclusions are more difficult to correct in the adult because the face is no longer growing and there are often social problems with full time appliance wear. To be effective, most appliances have to be worn full time and a typical course of treatment will take between one and two years.

In deciding whether orthodontic treatment is justified for a particular patient it is necessary to balance the potential benefits against the drawbacks. The principal problems are cost, inconvenience of regular visits for appliance adjustments, and the social problems of wearing unsightly appliances. Poor oral hygiene during appliance wear can have a disastrous effect on dental health. Particularly where extensive tooth movements are required, some shortening of the tooth roots may occur, although this is rarely serious in amount except in a few susceptible individuals who often show radiographic signs of root resorption even before treatment. Death and discoloration of a tooth is a rare event during orthodontic treatment, and it is most likely to occur where a tooth is already of diminished vitality subsequent to a blow.

Trends in the provision of treatment

Many general dental practitioners are happy to treat minor malocclusions with removable appliances. Competence in the use of fixed and to some extent of myofunctional appliances, however, require prolonged postgraduate training (two to three years full time), and they should generally be used only by an orthodontic specialist. Clinically they are time consuming, the components are costly, and so treatment is expensive. The growth of orthodontic specialist practice in the United Kingdom is quite recent, and so it is only now that complex treatment is readily available to most of those who need it. Many orthodontic specialists are unwilling, however, to undertake complex treatment within the provisions of the National Health Service because they claim, with some justice, that the fees are too low to cover their costs. 'The increasing use of fixed appliances depends not only on having manpower capable of carrying out the treatment but also on

there being sufficient funding to allow this more sophisticated treatment to be encouraged'.³

At a time when the financial resources available to the health service are under such severe constraint, it is difficult to envisage a greater proportion being diverted to the provision of orthodontic treatment. Thus many individuals who would benefit from complex orthodontic treatment do not obtain it but are either left untreated or receive compromise treatment with removable appliances that may be of questionable benefit.

The situation in the United Kingdom contrasts with that in North America where, at least among the more prosperous sections of the community, orthodontic treatment with fixed appliances is a common experience for the teenager that is looked upon almost as one of the features of adolescence. While this means that advanced orthodontic treatment is readily available to those who can afford it, there are a number of undesirable features of this system that should be recognised. Aggressive marketing creates an artificial demand for orthodontic treatment that is based upon social pressures rather than health needs, and thus many children undergo costly and time consuming treatment that is of questionable benefit to them. Furthermore, overemphasis on artificially regular teeth means that slight irregularities that might develop after treatment, either due to rebound after removal of appliances or to the minor settling changes that can occur through life, are unacceptable, and so many individuals are burdened with permanent retaining devices that are both inconvenient and can have deleterious effects upon the long term health of the dentition.

References

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