

accumulated throughout his life, and this does not desert him until extreme old age, if then (Cattell 1963). Fluid intelligence seems to be related to the ability to handle completely new learning, and information from crystallized intelligence may help or hinder new learning, depending on whether it can be applied directly or whether it requires modification in order to be of use.

Data from three studies of industrial training of middle-aged and older people were quoted. The first two, on retraining tram drivers and horse-dray drivers (Shooter *et al.* 1956, Entwisle 1959), showed that older people can learn, given enough time. For some, this may be as much as double that required by a 20-year-old. Tram driving experience appeared to aid learning to drive a bus, but horse-dray driving appeared to hamper learning to drive a lorry. It is not easy to predict whether previous experience will help or hinder, but in these cases the findings seem reasonable enough. The third study was on training burlers and menders of woollen cloth (Belbin 1957). It demonstrated that training time could be cut from one year to three months even with trainees older than normally considered for this job, provided certain methods were used. The learners were given good knowledge of the cues they should expect and on which they had to act, and they were given graduated practice so that the immediate task facing them was never too difficult.

Although there are real age differences in capacity to learn and adapt, such studies show that suitable methods can help older people. It is often no good using 'general verbal encouragement', since unwillingness to try new things is only confirmed by the set-backs the elderly are likely to encounter. The task must be specially designed for them so that they will not experience failure. Small amounts of progress on graduated tasks can be used to provide positive reinforcement. Perhaps the dentist can use analogous techniques to overcome physical and physiological difficulties for his patient, thereby avoiding disappointment for the patient with its likely consequence of unwillingness to continue treatment. Such techniques might involve provision of plenty of cues as to how the mouth should feel, and also a gradual building up of prosthetic aids to allow the person to acclimatize to the new feelings by degrees.

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#### The Elderly Dental Cripple

From an examination of a north of England population, Jackson & Murray (1972) indicate that a dentate individual of 60 or over is likely to have about 16 teeth. Extrapolating from their data, this could include 10 teeth in the lower jaw (i.e. 1 molar, 3 premolars, the canines and all the incisors) and 6 teeth in the upper jaw (i.e. 1 molar, 1 premolar, both canines and 2 incisors). We recognize this as the familiar skeleton of the dental cripple who has suffered the ravages of caries and periodontal disease, plus the attention for good or ill of the dental profession. The whole gamut of clinical dental problems – periodontal, endodontic, prosthetic and restorative – are presented for solution.

In dealing with the elderly patient it may well be the very quality of his life that we are affecting. It is important to keep this in mind and avoid the attitude that treatment for elderly patients should be of a temporary or semi-permanent nature. We are familiar with the considerable variation between individuals, and with the fact that chronological age may be a very poor guide to the way tissues behave in the face of dental intervention. In treating the elderly patient two basic factors have to be considered: the physical condition and behaviour of the elderly tissues, and the neurological and psychological state of the patient. More specifically, in arriving at a treatment plan the dentist must dovetail the dental prognosis with patient adaptability.

Boitel (1971) has rationalized the problem into four general situations:

- (1) If the patient is adaptable and there is a good dental prognosis, we can employ any restorative measure, as we would in a young patient.
- (2) If the patient is adaptable and the dental prognosis is poor, complete extractions and dentures may be indicated before the patient moves into a less adaptable phase.
- (3) If the patient's facility for adaptation is already impaired and there is a poor dental prognosis even saving a few roots may be helpful in retaining dentures.
- (4) If the patient's facility for adaptation is already impaired but the dental prognosis is good, restorative measures can be undertaken providing there is no interference with established muscle patterns such as those associated with changes in occlusion or in shape and size of a prosthesis.

Accepting this general model it remains to assess patient adaptability and the dental prognosis.

**Adaptability:** There are objective tests, but information about adaptability has to be gleaned intuitively by the dentist. Much information is gained by the way the patient reports his reaction to past dental intervention.

**Dental prognosis:** We are not concerned with the conservation of individual teeth but with the dentition as a whole, and we should be prepared to sacrifice individual teeth for the functional integrity of the dentition. In making a prognosis many factors have to be taken into account. These include age, the amount and pattern of bone loss, the possibility of removing etiological factors, the number and position of teeth present and the patient's general health (Manson 1970).

Several specific problems need to be considered in more detail.

**Extraction:** A decision to extract may be difficult at any age: it should follow careful deliberation in which all the possible consequences of tooth retention are weighed against those of extraction. Obviously the choices will be circumscribed by a variety of factors; nevertheless, it is important to apply a form of critical analysis in each case if one is aiming to produce long-term stability.

**Periodontal surgery:** In older people periodontal breakdown usually proceeds very slowly and the presence of pocketing should not automatically lead to a decision to carry out periodontal surgery. Unless there is an acute periodontal condition surgery is usually not indicated in patients of 65 and over. Pocketing can be controlled by regular deep scaling. On the other hand where surgery is indicated, no special precautions need to be taken merely on account of age. Occasionally healing is slow and periodontal dressings are needed for two weeks, but this is often the case in younger people.

**Endodontics:** Age should be no bar to the provision of endodontic treatment. Harty *et al.* (1970) showed that in endodontic treatment the failure rate is lower in patients over 45 than in those under 45. Seltzer *et al.* (1963) showed that over-60s had a better success rate than the under-60s.

**Occlusal adjustment:** A mutilated occlusion comes about by attrition, by extraction and by tooth movement. Tooth wear and tooth movement usually take place slowly and the masticatory apparatus as a whole may adapt successfully to these changes. The presence of gross attrition does not mean that there is loss of vertical dimension, and although worn teeth may need to be restored any opening of the bite may be strongly contraindicated. Most patients have no temporomandibular joint trouble and careless intervention attempting to 'restore' vertical dimension may well produce such problems.

It is very important to avoid applying average values such as 2 mm to the interocclusal space. Bite-raising which encroaches on the interocclusal

space may stimulate muscle contraction, temporomandibular joint problems and bruxism. The vertical dimension is better under-restored than opened, and no permanent alteration should be made without the prior use of a temporary acrylic bite plate.

#### Summary

The reconstruction of the mutilated dentition obviously presents a very large number of problems in which all one's insight and ingenuity may be involved. This paper very briefly indicates guidelines for the treatment of the elderly dentate person. If those guidelines appear applicable to all ages this demonstrates my view that the fact of chronological age alone should not be allowed to affect one's treatment plan.

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#### The Relationship Between Masticatory Performance and Diet

Advances in medicine and improvements in the social services have contributed to a growth in the number of people surviving beyond the age of 65. Since 78% of the population of England and Wales over the age of 65 is edentulous (Gray *et al.* 1970) it is to be expected that this increase in longevity is associated with a rise in the number of subjects wearing complete dentures.

In order to discover the effect of tooth loss and the contribution of prosthetic appliances to the quality of life of these old people we need to look at their dietary intake and nutritional state. Dietary intake is related to: food available, financial status of the individual, personal likes and dislikes, and masticatory capability. Fortunately we suffer no food shortages in Europe. However, there may be famine in the midst of plenty if the individual is unable to meet the cost of an adequate diet. Although most subjects included in dietary surveys are of modest means this is not always reflected in their selection of food. Exton-Smith & Stanton (1965) reported on the dietary intake of 60 elderly women living alone