

Features Section

Guest Editorial

The Need for Cost-effectiveness

Health care professionals are increasingly required to demonstrate that the orthodontic services they are providing are appropriately allocated and if treatment has been undertaken patients have benefited from the intervention.

Malocclusion is a continuum ranging from an ideal occlusion to considerable deviation from normal. Assessing cut-off points for those needing and not needing treatment is problematical. The severity of the malocclusion, appliance type to be employed, skill of the operator and co-operation of the patient all have to be taken into account. There are generally no accepted measures of assessing orthodontic treatment need. A collection of surveys has been compiled (Table 1). The level of need varies widely and depends on the criteria employed age, gender, type of population studied and the cut-off levels for severity of malocclusion. Treatment need estimates range from 27.5 to 76.7 per cent. The demand for orthodontic treatment is reported at much lower rates 2–47 per cent. The lower levels of demand may reflect the measure used in determining demand. The type of question often used is 'If you were offered orthodontic treatment would you accept it?' The tendency would be for the individual to say no and may not represent a valid reflection of demand. The level of need and demand fluctuates throughout different life cycle events, and change in wealth and social conditions (personal, national, and international). Need and demand is also influenced by dental development, facial growth, social awareness, culture as well as dental interventions as a result of dental decay, periodontal disease, and loss of teeth. It is unlikely that any simple index would be able to comprehensively assess orthodontic treatment need. However, the use of indices such as the Index of Orthodontic Treatment Need (IOTN) has facilitated documentation of deviant occlusal traits that are present in the population, in patients attending orthodontic offices, and the likelihood of treatment success in reducing or eliminating the deviant traits.

Risk Assessment

Risk evaluation is the complex process of determining the significance of possible adverse events. It therefore includes the study of risk perceptions, and the trade-off between perceived risk and perceived benefits.

It is the responsibility of the clinician to notify the patient of the relative possible adverse events in the context of the likely outcome of treatment. The risk/benefit balance errs on the risk side for minor malocclusions. For instance, open bites tend to be successfully treated in only 60 per cent of cases. Surgical of Class III malocclusion results in a relapse

on average of 25 per cent. The relapse tends to be greater with Class II malocclusions. In association with surgical procedures other risks involve possible death due to an adverse reaction to an anaesthetic and nerve damage resulting more commonly in paresthesia.

Cost-effectiveness

The assessment of clinical performance is important at the individual, practice, institutional and national levels. It is a challenge not only to deliver high standards of care, but also to deliver the care at the lowest unit cost. An index such as the PAR Index facilitates the assessment of cost-effectiveness. The PAR Index has been used to assess the standard of treatment using percentage reduction in PAR score. However, the use of percentage reduction is questionable both scientifically and statistically in assessing cost-effectiveness. For instance, a PAR score change from 50 to 5 (case 1) and 10 to 1 (case 2) both represent a 90 per cent reduction in PAR score. However, case 1 showed a change of 45 PAR points and case 2 only 9 PAR points. If both treatments cost 90 Euro's, using cost per PAR reduction the cost effectiveness would be 1 Euro per percentage reduction in PAR score. This would not represent the effectiveness of treatment and arguably inappropriate. If for instance case 1 cost 900 Euro's and case 2 90 Euro's the cost-effectiveness for both cases would be 10 and 1 Euro's per percentage reduction in PAR score. Again this method of assessing cost-effectiveness would not be appropriate. However, if reduction in score is used cost per PAR point reduction would be 2 Euro's for case 1 and 10 Euro's for case 2. With the second scenario the cost per PAR reduction would be 20 and 10 euro's, respectively. This would seem a better approach, although the change is not fully explained. It is unlikely that a single summary score will adequately describe cost-effectiveness. Table 2 gives examples of assessment of cost-effectiveness using four variables. It is important to assess the overall cost in terms of reduction in unit malocclusion and cost per visit. Interestingly, the cost per unit reduction of malocclusion is similar to cost per visit for orthodontic care in Norway and the community care in the UK. In contrast, the cost per visit for specialists and non-specialists is much higher than cost per unit reduction. This is related to the duration of treatment, the treatment time is much reduced with marginal increase in finish PAR score. Treatment duration is very variable from country to country and to some extent depends on the type of service where it is delivered and also the health care and remuneration system. An average treatment duration of 36 months in the Netherlands is high compared to 16 and 17 months in the

TABLE 1 International studies for treatment need and demand

	Index	Type of sample	Age group	% Need	% Demand
Argentina	WHO-FDI	1554	12-13	Amerindian 18	Caucasian 28
Denmark	Björk <i>et al.</i>	Representative 531	9-10	70	
England and Wales	IOTN	Representative 10,291	9-15	9 years 31 5-15 years 15-33 11-12 years 27.5	12 years 16
Finland	Björk <i>et al.</i>	Representative 100 Boys 100 Girls	7-7	23.5 Need 34.5 Observation	
Japan	Dental Aesthetic Index	409	15-18	22 crowding 40	
Kenya	Norwegian Orthodontic Treatment Index (NOTI)	91	13-15	29%	33
Norway	Norwegian Orthodontic Treatment Index (NOTI)	93	11	65	47
Netherlands	OWN	Representative	15-74	15 years 35-39	15-19 yrs 23.5
Saudi Arabia	Björk <i>et al.</i>	500 males	14	62.4	
Sweden	Björk <i>et al.</i>	920	<20	Male 35 Female 40	Male 8 Female 11
Turkey	Treatment Priority Index		6-10	Minor 22 Definite 25 Severe 8 Very severe 5	
USA	Own	3696 Representative		Females 42 Males 44	Females 9.5 Males 6.8
				White 46 Black 36	White 12 Black 1
					High social class 12
					Low social class 2
Zambia	Summer's Occlusal Index	601	9-12	17%	

TABLE 2 Examples of cost-effectiveness in different countries and settings

Cost per unit reduction in PAR score (€)	Cost per visit (€)	Duration of treatment (months)	Cost (€-euro)	Finish PAR score	Setting where the study was undertaken
45	43	24	869	4	Specialist practice (Norway)
30	33	25	620	6	Community clinics (UK)
28	47	17	659	7	Specialist orthodontist (UK)
35	51	16	659	8	Non specialist orthodontists (UK)
—	—	36	—	8	Hospital care (Netherlands)
—	—	30	—	6	Extraction cases (Hospital USA)
—	—	26	—	6	Non-extraction cases (Hospital USA)

UK with no difference in the finish PAR score. To some extent duration of treatment is influenced by the severity of the malocclusion, level of training, experience of the clinician, type of monitoring techniques employed during treatment, aspirations of the clinician, method of remuneration and health care system. The average number of completed orthodontic cases per year in England and Wales is 300. The case load is determined by many factors such as, speed of operator, use of auxiliaries, remuneration system, level of remuneration and the orthodontist desired level of income. There is a tendency for lower levels of remuneration to be associated with higher case loads.

The cost of orthodontic treatment in relation to the patient is often forgotten in the assessment of cost-effectiveness. These costs are direct non-treatment costs (e.g. travel), indirect costs (e.g. loss of earnings), and intangible costs (e.g. pain, anxiety). The first two items are relatively easy to measure. However, the latter is very difficult to put a valid price on pain and anxiety. Interestingly, in a recent study of assessing the cost per visit for orthodontic treatment in the hospital, specialist practice, and community service the patient costs per visit were 23.3, 18.6, and 13.1 Euro's, respectively. If the same cost is spread over a course of treatment the total cost of treatment to the patient in each service would be 560 Euros (Hospital), 373 Euro's (Specialist practice), and 253 Euro's (community).

Although orthodontists often consider that patients receive 'free' treatment this is clearly not true as the patient is investing a significant amount in time and travel expenses to attend the orthodontists office.

There is a need to assess cost-effectiveness to value the treatments provided to the patients. It should not be forgotten that the patient incurs a significant cost when undergoing treatment.

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