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Orthodontic treatment need and demand in 12–14-year-old north Jordanian school children

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SUMMARY This study was undertaken to assess the need and demand for orthodontic treatment among 12–14-year-old north Jordanian school children. In total, 1002 students randomly selected to represent five geographical areas of Irbid were examined. The examinations were carried out twice, first on the pupils in the school premises and then using study models taken from each student. The dental health (DHC) and aesthetic (AC) components of the Index of Orthodontic Treatment Need (IOTN) were used as an assessment measure of the need for orthodontic treatment. The demand for orthodontic treatment was measured by asking the students 'if it was necessary, would they like to have their teeth straightened by an orthodontist'.

The results showed that approximately one-third (34 per cent) of the children examined had a definite need for orthodontic treatment. Within this group, 73.5 per cent were in need of orthodontic treatment according to the DHC, 23.5 per cent had both DHC and AC great need scores, and 3 per cent were in need according to the AC only. Severe contact point displacement of more than 4 mm was the most common occlusal feature in the definite treatment need group, followed by impeded eruption of teeth, hypoplasia of a single tooth and increased overjet of more than 6 mm but less than or equal to 9 mm. The demand for orthodontic treatment among the students was 49 per cent. Approximately half of them (54 per cent) had a definite need for orthodontic treatment.

This study provides baseline data on the need and demand for orthodontic treatment among a Jordanian population, which is important for planning public orthodontic and dental services.

Introduction

Planning orthodontic treatment within a public health system requires information on the orthodontic treatment needs of the child population. A wide variation in the reported prevalence of orthodontic need exists, ranging from 11 per cent in Sweden (Myrberg and Thilander, 1973) to 75.5 per cent in Saudi Arabia (Al-Emran *et al.*, 1990). The subjectivity of different indices used to record treatment need (Downer, 1987) and their questionable validity and reliability (Foster, 1980) may have contributed to such variations.

The Index of Orthodontic Treatment Need (IOTN) developed by Brook and Shaw (1989) is gaining wide acceptance in the UK and other parts of Europe. It has proved to be a valid, reliable and quick index to assess orthodontic treatment need (Burden and Holmes, 1994).

Orthodontic treatment need using the IOTN varies in children and adolescents in different populations. Thirty-three per cent of British children examined showed a great need for orthodontic treatment (Holmes, 1992a; Burden and Holmes, 1994; Shaw *et al.*, 1995). Hamdan (2001), using the dental health component (DHC) of the IOTN, found great need for orthodontic treatment in 28 per cent of Jordanian children aged 14–17 years.

In all reported studies, the demand for orthodontic treatment was higher than the actual need. In the UK, Holmes (1992b) examined 955 12-year-old children and reported that 86 per cent of the children were prepared to accept orthodontic treatment. In Kenya, Ng'ang'a *et al.* (1997) who examined 919 13–15-year-old children found that 33 per cent were willing to have orthodontic treatment. In Hong Kong, Wang *et al.* (1999) reported that 40 per cent of the 765 12-year-old children examined would like to have orthodontic treatment.

Information regarding the need and demand for orthodontic treatment among north Jordanian children is not available. The aim of this investigation was to determine orthodontic treatment need among 12–14-year-old school children in northern Jordan using the IOTN.

Subjects and method

In total, 1002 (386 male, 616 female) students aged 12–14 years in 10 representative public schools in Irbid (northern Jordan, population 800 000) were examined. These were selected from a list obtained from the Directorate of Education in Irbid Governate. For the purpose of this study, the schools in the list were categorized into five sections according to geographical location. These were central (10 schools), eastern (12

schools), western (12 schools), northern (12 schools) and southern (12 schools). Two schools containing 12–14-year-old children were randomly selected from each geographical area.

Approval was obtained from the individual head of the schools and a negative consent letter was sent to students, parents and guardians.

A full clinical examination was carried out using a mouth mirror under natural lighting, followed by taking alginate impressions for each student together with a wax bite in school premises and poured the same day by an orthodontic technician. Students who had orthodontic treatment or were currently wearing an orthodontic appliance were not included in this study. Peri-apical radiographs were also taken when hypoplasia was suspected. Each malocclusion was re-examined using the poured stone models. If the clinical and model examinations did not match, the model examination was preferentially recorded. The examination was carried out by one author (EAA) who had been previously trained and calibrated in the use of the IOTN. To evaluate the demand for orthodontic treatment, each student was asked verbally 'if it is necessary, would you like to have your teeth straightened'.

Each student's occlusion was assessed using the IOTN. The DHC of the IOTN records the various occlusal traits into five grades according to severity and the need for orthodontic treatment. Grades 1 and 2 represent 'no need for treatment', grade 3 'borderline' and grades 4 and 5 are considered to be a definite need for orthodontic treatment. The aesthetic component (AC) has a scale of 10 coloured photographs showing different levels of dental attractiveness, with grade 1 representing the most attractive and grade 10 the least attractive. According to Richmond *et al.* (1995), grades 1–4 represent no or little need, grades 5–7 borderline need and grades 8–10 a definite need for orthodontic treatment.

Reproducibility

Twenty-five of the children were re-examined 1 month after their initial examination. Kappa values for the DHC and the AC were 0.76 and 0.68, respectively, indicating good agreement (Cicchetti, 1976).

Results

The survey revealed that 257 (26 per cent) of the children had 'no need' for orthodontic treatment with either the DHC or the AC. Four hundred and three (40 per cent) children had a borderline need for orthodontic treatment with the DHC and/or AC. The number of children with a definite need for orthodontic treatment (DHC and/or AC) was 342 (34 per cent). The distribution of DHC and AC grades is illustrated in Figures 1 and 2, respectively.

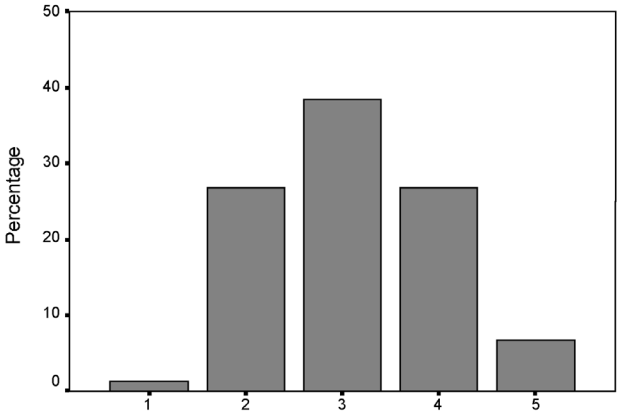

Figure 1 Dental health component grades of the Index of Orthodontic Treatment Need in north Jordanian school children (grades 1 and 2, 'no need'; grade 3, 'borderline need'; grades 4 and 5, 'definite need').

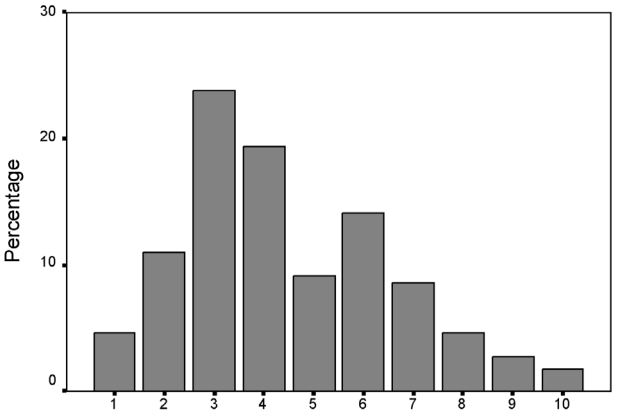

Figure 2 Aesthetic component grades of the Index of Orthodontic Treatment Need in north Jordanian school children (grades 1–4, 'no need'; grades 5–7, 'borderline need', grades 8–10, 'definite need').

The children in need of orthodontic treatment were grouped into three categories according to their DHC and/or AC need. The first category comprised children in great need according to the DHC but acceptable or borderline with respect to the AC (73.5 per cent). The second group comprised those who had a great need according to both the DHC and the AC (23.5 per cent). The third category contained those with an aesthetic need for treatment only (3 per cent).

Four hundred and ninety-five students (49 per cent) were willing to have orthodontic treatment if it was necessary. Sixty-seven per cent were female and 33 per cent were male. Of those, only 185 students (54 per cent) had a definite orthodontic treatment need.

Discussion

Approximately one-third (34 per cent) of 12–14-year-old children in north Jordan were considered in definite

need of orthodontic treatment using the IOTN. This index has been developed using the available data on the functional and psychological ill-effects of a malocclusion. It is also quick and reliable when used to assess treatment need at a community level, as it only records the most severe occlusal traits (Burden and Holmes, 1994).

The estimate of one-third of 12–14-year-old children in need of orthodontic treatment is similar to the figures reported by Holmes (1992a), Burden and Holmes (1994) and Shaw *et al.* (1995) for British children, but higher than those found by Hamdan (2001) for Jordanians in Amman (central Jordan). Hamdan (2001) examined 320 children aged 14–17 years using the DHC of the IOTN. He reported that 28 per cent of the children examined were in great need of orthodontic treatment. The smaller sample size and the different age group used may have contributed to the difference in the reported need.

The main occlusal features responsible for allocating children in great need of orthodontic treatment were severe contact point displacement of more than 4 mm (45 per cent), impeded eruption of teeth (17 per cent), hypoplasia of a single tooth and increased overjet of greater than 6 mm but less than or equal to 9 mm (11 per cent). These figures are close to those reported by Hamdan (2001) for 14–17-year-old Jordanians, who found that 45 per cent of children with definite treatment need had a severe contact point displacement of more than 4 mm followed by impeded eruption of teeth in 24 per cent of children.

The demand for orthodontic treatment was 49 per cent in the present study. A definite need for treatment was recorded in 185 students (54 per cent) only. This was less than that reported by Holmes (1992b) for UK children. Holmes (1992b) found that 86 per cent of the children examined were willing to accept orthodontic treatment. In Kenya and Hong Kong, Ng'ang'a *et al.* (1997) and Wang *et al.* (1999) reported less demand for orthodontic treatment, 33 and 40 per cent, respectively. The low demand for orthodontic treatment reported in this study may be due to the low socio-economic status of the people in the public schools of northern Jordan.

Conclusions

The results of this study provide baseline data on the orthodontic treatment needs of 12–14-year-old north Jordanian children which will help to decide treatment priorities among those demanding orthodontic treatment at public expense.

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References

Al-Emran S, Wisth P J, Böe O E 1990 Prevalence of malocclusion and need for orthodontic treatment in Saudi Arabia. Community Dentistry and Oral Epidemiology 18: 253–255

Brook P H, Shaw W C 1989 The development of an index of orthodontic treatment priority. European Journal of Orthodontics 11: 309–320

Burden D J, Holmes A 1994 The need for orthodontic treatment in a child population of the United Kingdom. European Journal of Orthodontics 16: 395–399

Cicchetti D V 1976 Assessing inter-rated reliability for rating scales; resolving some basic issues. British Journal of Psychology 129: 452–456

Downer M C 1987 Craniofacial anomalies—are they a public health problem? International Dental Journal 37: 193–196

Foster T D 1980 Orthodontic surveys—a critical appraisal. British Journal of Orthodontics 7: 59–63

Hamdan A M 2001 Orthodontic treatment need in Jordanian school children. Community Dental Health 18: 177–180

Holmes A 1992a The prevalence of orthodontic treatment need. British Journal of Orthodontics 19: 177–182

Holmes A 1992b The subjective need and demand for orthodontic treatment. British Journal of Orthodontics 19: 287–297

Myrbeg N, Thilander B 1973 Orthodontic need of treatment of Swedish schoolchildren from objective and subjective aspects. Scandinavian Journal of Dental Research 81: 81–84

Ng'ang'a P M, Stenvik A, Ohito F, Ögaard B 1997 The need and demand for orthodontic treatment in 13- to 15-year-olds in Nairobi, Kenya. Acta Odontologica Scandinavica 55: 325–328

Richmond S *et al.* 1995 The relationship between the index of orthodontic treatment need and consensus opinion of a panel of 74 dentists. British Dental Journal 178: 370–374

Shaw W C, Richmond S, O'Brien K D 1995 The use of occlusal indices: a European perspective. American Journal of Orthodontics and Dentofacial Orthopedics 107: 1–10

Wang G, Hägg U, Ling J 1999 The orthodontic treatment need and demand of Hong Kong Chinese children. Chinese Journal of Dental Research 2: 84–92