

TOOTH DEFECTS TREATED BY DENTAL IMPLANTS IN ADOLESCENTS

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Abstract

The authors present the results of a 5-year study of the use of cylindrical or screw implants in adolescents 15 to 19 years old. A total of 191 dental implants were inserted in 135 patients. Augmentation by Bio-Oss biomaterial was used when required. The clinical success rate was assessed by means of selected criteria, i.e., patient's sex, the type of implant, the cause of tooth defect (injury, tooth retention, developmental hypodontia, tooth loss due to inflammation or extraction) and the type of prosthetic reconstruction supported by the implant. Regardless of the criterion used, the rate of success was always higher than 96 % over the five years of the study.

Key words

Adolescent, Dental implant, Cylindrical implant, Screw implant, Clinical success rate, Osseointegration

INTRODUCTION

The dentition of 15- to 19-year-old adolescents is specific in terms of age-related, unfinished development of alveoli, specific causes and types of tooth defects and treatment plans (1, 2). In this age category, the loss of teeth occurs most often because of injuries and less frequently due to hereditary developmental defects, such as tooth retention, tooth malformation or hypodontia. A premature tooth loss may also be caused by caries or dental inflammatory processes. The process of remodeling taking place in the maturing jaws of adolescents plays an important role when insertion of an implant is considered. In the maxilla, this process includes the apposition on the palatal side of the alveolar ridge and in the tuber maxillae region, and bone resorption on the ventral alveolar side. In the mandible, the apposition is located to the dorsal side of the ramus mandibulae, the lateral side of the distal corpus mandibulae or the caudal side of the frontal corpus mandibulae; resorption that occurs on the vestibular part of the frontal jaw may result in anterior or posterior rotation (3). These developmental aspects should be considered when dealing with dental implant insertion; for instance, an implant after successful osseointegration may, in the final phase of jaw growth, slightly change its position (4).

The aim of this paper was to present the results of a 5-year clinical study on the insertion of dental implants in adolescents. The evaluation of treatment in our patients was based on the specific type of their dental defect and the type of prosthesis supported by either dental implants or teeth or both.

MATERIALS AND METHODS

In the period of 1996 to 2001, a total of 191 dental implants were inserted in the upper and/or lower jaws of 135 adolescents treated at the Department of Stomatology, St. Anne's Teaching Hospital, Faculty of Medicine in Brno. The group comprised 92 females and 43 males aged 15 to 19 years in whom 108 cylindrical and 83 screw dental implants were used. To ensure optimal tooth positions in the dentitions that had dental defects and/or atrophic alveoli, orthodontic pre-treatment and, in indicated cases, augmentation with Bio-Oss material and/or a Bio-guide membrane were used (5).

In order to evaluate the success rate of dental implant in-growth during the 5-year period, standard criteria based on clinical and radiographic findings were used (6, 7).

The success rate was assessed in the whole patient population, in men and women separately and according to the cause of dental defects. The cause was further classified as injury, tooth retention, developmental hypodontia, hereditary hypodontia or tooth loss due to inflammation. The evaluation also included the type of prosthesis attached to a dental implant, which was either a single crown, a crown block supported by a tooth and an implant, or a crown block supported by implants.

RESULTS

Our patients showed a high success rate over the 5-year period of study. The insertion was classified as successful when the implant became well osseointegrated, alveolar bone resorption was less than 1 mm and the implant-supported restoration fitted and functioned satisfactorily. The results of evaluation by these criteria are summarised in *Table 1*.

The overall success rate in the whole patient population was very high. The only adolescents in whom the restorative treatment was slightly less successful were the patients with hereditary hypodontia and the male patients when compared with the female patients.

DISCUSSION

The treatment of tooth defects with enosseal dental implants in the adolescents studied showed a high rate of success regardless of the criterion used for evaluation. Our values were comparable with the results obtained in patients who had dental implants inserted in fully matured jaws (6, 8). They also testified to the high quality of enosseal implants used (6, 7, 9). Our results also show that dental implant insertion can be successful in younger patients in whom the jaw is still in the process of development and inter-relations of its components have not stabilised yet. However, good outcomes can be achieved only if standard procedures of dental implantation are strictly observed (10) and the specific features of remodeling taking place in jaw and alveolar bone during its

Table 1

Treatment of patients with tooth defects by dental implants

Group evaluated	Number of Implants	Number of patients	Rate of success (%)
Whole population	191	135	98.95
Women	124	92	100.00
Men	67	43	97.01
Patients treated with			
cilindrical implants	108	76	99.07
screw implants	83	59	98.80
Patients with			
defective dentitions due to injury	71	42	100.00
hereditary defects	64	42	96.88
tooth retention	29	26	100.00
extraction after inflammation	18	17	100.00
developmental hypodontia	9	8	100.00
Patients with			
single crown	81	62	100.00
crown block on implant and tooth	64	42	96.88
crown block on implants	46	31	100.00

maturation are respected (3). A comprehensive care in adolescents should therefore be based on the team work of a specialist in implantology, paediatric dentist, orthodontist and, if necessary, any other dental specialist (4, 1, 2, 11).

The high clinical success rate was not affected even when an atrophic alveolus had to be treated by augmentation with a Bio-Oss biomembrane (5). The lower rate of success recorded in the patients with hereditary hypodontia can be accounted for by the fact that this condition is associated with defective bone development. An alveolar bone that is not wide enough does not provide conditions for the successful placement of an implant and its good incorporation into the surrounding tissue (5).

It may be concluded that insertion of enosseal implants is a useful method that allows us to provide an early and high-quality care to adolescents with dental defects regardless of the defect's origin.

DEFEKTY CHRUPU MLADISTVÝCH ŘEŠENÉ POMOCÍ DENTÁLNÍCH IMPLANTÁTŮ

S o u h r n

Autoři prezentují pětileté zkušenosti se zaváděním válcových a závitových implantátů mladistvým pacientům ve věku 15–19 roků. Do klinického hodnocení bylo zařazeno 191 implantátů zavedených 135 pacientům. Při zavádění implantátů byla v případech potřeby také využita augmentace biomateriálem Bio-Oss. Vedle celkového hodnocení byla klinická úspěšnost hodnocena z hlediska pohlaví pacientů, typu zavedeného implantátu, příčiny defektu chrupu: úraz, retence zubu, hypodontie vývojová, hypodontie dědičná, ztráta zubu z důvodu zánětu – extrakce a také z hlediska typu protetické rekonstrukce nesené implantáty. Celková klinická úspěšnost vyjádřená v procentech za pětileté sledované období byla zaznamenána u všech souborů velmi vysoká, nad 96 %.

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