The Placement of a Glass Ionomer Surface Protection Material on Permanent Molars of Special Olympics Athletes

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Abstract

Background: Healthy Athletes is a Special Olympics program that provides free health screenings in various health areas to Special Olympics athletes. The Special Smiles Program within that organization provides oral health screening and data collection for intellectually disabled special athletes participating in sports events. These athletes in many parts of the world have been reported to have poor oral health and high unmet treatment needs.

Objective: The aim of this study was to examine the oral status of Turkish Special Olympics athletes, and to assess the quantity of untreated caries and dental restorative needs, using specifically dedicated screening forms designed to be helpful in motivating oral hygiene, and also to evaluate the clinical applicability of a high fluoride content glass ionomer sealant and surface protection material (Fuji TRIAGE®, GC Europe N.V.), on permanent molars of a group of Special Olympics athletes.

Methods: Ninety-two Special Olympics athletes, aged 8-25, received oral examinations and evaluations by trained volunteers, using the standardized Special Smiles screening forms and protocol. Following the screening, the surface protection material was placed on surfaces of caries-free first permanent molars of athletes by the ART approach.

Results: A total of 92 athletes aged 8 to 25 years, 43 (46.7%) females and 49 (53.2%) males, participated in the screening. Of the examined athletes, 34 (37%) cleaned their mouths once daily, 15 (16.3%) reported oral pain, 62 (67.4%) had untreated caries, 16 (17%) had fillings, 60 (65.2%) had gingival signs suggestive of periodontal disease, 38 (41.3%) needed urgent care, and 54 (58.6%) required nonurgent care. The surface protection material was placed on a total of 273 occlusal surfaces of permanent molars.

Conclusion: Our findings offer an evaluation of the oral health of a group of Special Olympics athletes with intellectual disabilities in Turkey. Results showed high preventive and restorative oral health needs in the Special Olympics athletes. Therefore, offered in a fun, welcoming environment, effective and easily applied preventive protocols and treatments may be specifically designed for those athletes to be helpful in providing oral hygiene. The glass ionomer surface protection material could be used satisfactorily for caries prevention. The longer-term clinical performance of this material should now be assessed.

Keywords: Glass ionomer; Special Olympics; Oral health

Introduction

The Special Olympics is a year-round sports training and athletic competition program for people with intellectual disability (ID). Although the program was founded in 1968, a recent addition has been the Healthy Athletes initiative, which was designed to help the athletes improve their health and fitness and enhance their sports experiences and overall well-being [1].

The Special Olympics Special Smiles (SOSS) program is a segment of the the Special Olympics Healthy Athletes (SOHA) initiative, providing non-invasive oral health screening and referrals, data collection, oral health education, and preventive dental supplies for athletes involving in sports activities throughout the world. The mission of the SOSS program is to increase access to dental care for SOHA, as well as all children and adults with ID, and to increase the number of dental professionals who will serve them in their practices. It is also a means of increasing the awareness of the athletes, as well as their parents, and/or caregivers of the importance of oral health [2-5].

Despite a mistaken belief that people with ID receive the same or better health care than others, they typically receive sub-standard care, or virtually no health care at all [2]. Disability may restrict the dental-treatment options provided or offered by the dental care service, and it has been reported that patients with disabilities have more untreated dental caries than others. The reason for this is not fully known [6].

Data collected during such screenings within events from around the world reveal high treatment needs and little evidence of past oral and dental care [4,7-9]. A high prevalence of untreated dental caries and poor gingival health and oral hygiene has been reported worldwide [4,10].

Primary prevention is the most desirable prevention, as it eliminates the chance of occurrence of a disease. It avoids pain, agony and discomfort [11]. The goals and purpose of preventive dental care for persons with ID, including personal oral hygiene procedures, are no different than those for the general population. The emphasis on preventive dental care is based on the public health principle that preventing disease is less costly in the long term, and reduces the need for invasive future treatments [12]. Application of fissure sealants is one
Methods

The study was conducted on a sample of 92 young SO athletes with mixed dentition aged 8 to 25 years, to test the applicability of the GIS surface protection material (GC Fuji TRIAGE®, GC America). All the athletes included in the study were attending a SOHA event in Sinop, Turkey. The study group consisted of a population of intellectually disabled athletes. Although these athletes varied considerably in the type and degree of disability, all have the skills required for daily living to enable an individual to work, play and live in the community at large. They do not receive professional dental care. They were told about the "Healthy Athletes” venue area in the Olympic Site, where they could have their teeth checked, eyes examined, skin checked, or other health-related screenings. Athletes volunteered of their own accord and consent was obtained from a parent /trainer or caregiver.

A self-report questionnaire was completed by all subjects or by their trainers. The screenings were carried out concurrently with the games, and the Centers for Disease Control and Prevention (CDC) in Atlanta was used for the screenings [17]. Information required on the screening form (Table 1), included the bio-data of each athlete, mouth cleaning frequency, presence or absence of pain in the mouth, untreated caries and site of caries, filled and missing teeth, injury to the anterior teeth, fluorosis, gingival signs, treatment urgency, and whether or not the athlete required a mouth guard to compete in a contact sport.

Trained volunteers for oral screening included experienced pediatric dentists from the Marmara University, Dentistry Faculty. They performed oral screening and placement of surface protection material, and were responsible for data collection. During the dental screening component, oral screeners were prepared with disposable gloves, a disposable mouth mirror, a disposable mask, a tongue depressor, and a flashlight to assist in viewing the athletes’ teeth. Each athlete was examined by a single pediatric dentist, while sitting in a chair in the Healthy Athlete venue area.

Following oral screening, the surface protection material (Fuji TRIAGE®, GC Europe N.V.) was placed on a total of 273 surfaces of caries-free permanent molars of 92 athletes. Prior to the study, several calibration sessions were conducted with all participating pediatric dentists, where the criteria for caries diagnosis and the indications for sealing were discussed.

Prior to the evaluation, visible debris and plaque were removed with an explorer. The teeth were cleaned with water on a small cotton pellet and dried using a cotton pellet.

Glass ionomer capsules in the GC Fuji Triage kit were mixed according to the manufacturer’s instructions, and “press finger” [16] was used to spread a GIC, with setting time of 2 minutes and 45 seconds to seal the pits and fissures. The pits and fissures were slightly overfilled to enhance adherence and penetration of the material. A gloved finger with petroleum jelly was used to push the material into pits and fissures. The excess was removed by the finger sideways after a few seconds. The athletes were instructed not to eat for at least one hour.

If required, following the oral examination and GIC surface application, the athletes were referred to a nearby dental facility for treatment. Oral health education and toothpaste, a toothbrush and other items were given to each.

Data Analysis

After the SOSS event, data were collected from the written forms, recorded and evaluated using the Statistical Package for Social Sciences (SPSS) 20.0 for Windows. The percentage arithmetic mean value was calculated for all observed parameters.

Results

Of the 113 athletes, 92 participated in the oral health screening, including 43 (46.7%) females and 49 (53.2%) males. Athletes were accompanied mostly by their trainers or a volunteer (university students). 18.5% of athletes who came to the medical venue refused to have an oral screening. It is important to emphasize that consent was obtained from a trainer or caregiver prior to oral screenings.

The majority of subjects—52 (56.7%)—cleaned their mouths once a week or less, 34 (37%) cleaned their mouths once daily, and 6 (6.5%) were not sure. Only 15 (16.3%) reported oral pain, about 62
(67.4%) had untreated caries, and the most frequent site for caries was the molars (78.6%). Only 16 subjects (17%) had fillings; 35 (38%) had missing teeth; 60 (65.2%) had gingival signs suggestive of periodontal disease; 38 (41.3%) needed urgent care, such as extractions, endodontic treatment or surgical management; 54 (58.6%) required nonurgent treatment, such as professional prophylactic cleaning and restorations; and none had a sealant; as shown in Table 1.

The surface protection material could be applied to 273 occlusal surfaces of caries-free permanent molars of athletes who allowed us access. The retention or caries prevention of Fuji VII glass ionomer material was not evaluated; therefore, no conclusions could be drawn from the material itself.

Discussion

Although no national studies of the oral health condition of individuals with special needs have been carried out in Turkey, local studies indicate that individuals with special needs have poor oral hygiene, higher prevalence of dental caries, and more need for restorative services than individuals in the general population [18]. This is the first report of the oral health status and placement of tooth surface protection material on the posterior teeth of Special Olympics athletes, using Fuji VII, who were participating in the Athleticism Tournament in Turkey.

Comparison to local data from the general population may, in itself, be imprecise because of differences in data collection and sample selection methods. However, the oral health findings from this population of Special Olympics athletes can be compared with those for other athletes around the world, because standardized forms are used [17].

Overall, the proportion of athletes between the ages of 8 and 25 years who had experienced untreated dental decay (67.4%) was higher than targeted goals set by Healthy People 2010 (42% to 51%) [19]. In a study that compared athletes from numerous countries (including Turkey) with athletes from the United States, it was reported that the international athletes were more likely to have untreated caries (50%), and less likely to have restorations (20%) and sealants (1.8%) (9,18). This situation was worse in our study, as we did not observe any sealant application, and only 16 subjects (17%) had fillings. Also, the prevalence of missing teeth (primary, premolar, and third molar teeth were excluded) was similar in athletes with ID from the U.S., but lower than that of Italian Special Olympics Athletes [3,19].

For patients with ID, behavioral problems may be related to undiagnosed and untreated oral pain [20]. In most cases, the pain was attributed to untreated caries and periodontal problems [10]. The majority of the athletes in this study (65.2%) had gingival signs suggestive of periodontal disease, which is similar to previous reports on children and young people with ID, who have also shown poor gingival and periodontal status [10,21,22].

It should be noted that these findings (of oral health needs) are for a population of individuals with ID with increased supportive programs, who are not necessarily representative of the general population of individuals with ID.

When caregivers and parents were questioned, it was clear that they paid no attention to the oral hygiene of these children and young adults. A similar finding was also stated by Kinnby and Widenheim [23]. Nicolaci and Tesini [24] reported that caregivers were not familiar with how to maintain oral hygiene in children with special needs.

Therefore, the main focus in dental care for these patients should be promotion of oral health, early diagnosis and intervention, when problems occur. To achieve this, the dental staff must have good communication skills and be able to support families, and encourage them to manage daily oral health care. Unfortunately, there is very limited, even insufficient, research on effective ways to prevent dental caries and periodontal disease in patients with disabilities. It is likely that preventive measures that have been proven to work for other patients are also applicable for this group of patients, but that the modes for prevention should be more individually tailored. It is also probable that more chair-side prevention should be used than for non-disabled child patients [6].

The maintenance of a clean, dry field was a problem in individuals with intellectual disabilities. The “press-finger” technique is recommended for sealant placement; this technique condenses and ensures penetration of the cement into the pits and fissures [16,25]. Poulsen et al. [26] reported that the sealants tested (Delton and Fuji III) presented a similar pattern of penetration into the pits and fissures, with no statistically significant differences among the studied groups. The high viscosity of GICs can be compensated for by the finger pressure technique. In recent years, high-viscosity glass ionomers have been used as fissure sealants [27]. In the present study, the “press finger” technique was also performed.

The overall outcome of the computed datasets suggests no difference between the caries-preventive effects of GIC- and resin-based fissure sealants [28]. Donley et al. [29] reported that resin-modified glass ionomer in constant contact with an adjacent incipient carious lesion can act as a fluoride reservoir, and has the same remineralization capacity as twice-daily brushing with a fluoridated toothpaste. Others have suggested that fissures sealed with glass ionomer are more resistant to demineralization than control fissures; even after macroscopic loss of sealant [30], small amounts of sealant remain in the fissures and release fluoride, even after the sealants appear to have been lost [31].

In this study, the retention or caries prevention of Fuji Triage glass ionomer material was not evaluated. We thought that, because of the high fluoride content of this material, it can act as a fluoride reservoir in the oral cavity. The most important feature was treatability for people with ID.

Considering that the amount of fluoride released by this high fluoride content product is thought to be greater than with other glass ionomers [32,33], we believe that it may be promising as a pit and fissure sealant, especially in disabled people.

Study Limitations

Our results must be interpreted in light of the limitations of this study. The Special Smiles official screening form is a simplified chart that does not consider the actual dentition of each athlete. Because of the limited time available for each examination, examiners used a yes/no format.

Conclusion

These events offer a unique opportunity for oral health care professionals to learn how to work with and provide dental services to people with intellectual disabilities, as well as to collect oral health data to help target policy decisions.

Dental professionals who are willing to treat patients with special needs should be adequately reimbursed to improve their motivation, because of the extra time and effort needed to adequately treat these
patients. There is a need to identify the type and availability of current dental service centers for individuals with disabilities. Such an effort to catalogue dental school and health department programs, as well as the number of private dental practitioners, would provide an essential basis for lobbying for improved educational programs and service arrangements [34].

Finally, it has been suggested that participants in Special Olympics events may have better access to dental care than the general population of people with disabilities.

References

17. White JA, Beltrán ED, Perlman SP (1998) Training manual for standardized oral health screening. Division of Oral Health, National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention (CDC), Atlanta, USA.