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Studying the effect of anabolic androgenic steroids on the oral health of athletes

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ABSTRACT

Introduction: Anabolic androgenic steroids (AAS) are the synthetic derivatives of testosterone hormone; which are used by athletes; in order to increase muscle size, improve physical image and increase strength. They are usually being used out of medical supervision and in high doses. The low age of the athletes using these testosterone analogs and the proven discernable effects on the body organs necessitates a study to evaluate the possible effects on the oral health.

Materials and Methods: 50 male bodybuilders with the history of sports professional activity at least for one year (experimental group) and were using anabolic androgenic steroids and 50 male bodybuilders who has not used anabolic androgenic steroids were assessed for the personal habits as: tooth brushing, use of dental floss and mouthwash and the frequency of dentist visit by fulfilling a simple questionnaire. Three indices: PUFA, DMF, and OHI-S were evaluated for both groups.

Results: According to personal habits related to oral health, only there was a significant between the athletes for frequency of dentist visit (P< 0.03), indicating that the control group had dentist visit more frequently. According to the three indices evaluated only the OHI-S index was higher in the steroid using group (P<0.01).

Conclusion: As the results showed the dental caries indices: PUFA and DMF showed no significant difference among athletes; this could be due the low age of athletes using anabolic androgenic steroid and the use of these drugs out of medical supervision may suggest that long term studies are needed to verify the cariogenecity of anabolic androgenic steroids in human mouth. And the short term study showed no cariogenic effect.

Key words: Testosterone, AAS, Bodybuilding, Dental caries.

Introduction

Anabolic androgenic steroids (AAS) are synthetic derivatives of testosterone hormone; which are used to improve physical performance, body image and increase strength [1]. In 1940s, these analogs of testosterone were first produced in order to compromise the consequences of wasting syndromes and increase body mass [2]. Although the medical uses of AAS developed and progressed during the years of 1940s, its abuse got widespread among athletes in the years of 1960s and 1970 [3]. While the mechanism of action of AAS is complicated and not well known; Supraphysiologic doses, affects the body health: Supraphysiologic doses may cause depen-

dence syndrome according to its psychoactive and myoactive effects [4]. Its direct effect on male reproductive system includes: male hypogonadism, reduced spermatogenesis, dysfunction of erection, gynecomastia and male pattern baldness [5]. High doses of AAS leads to dermatological conditions such as: acne [6] and kidney structure and function may be at risk [7].

While there are variety of studies according to the effects of AAS on body organs; a lot of studies do not consider the high doses of these anabolic agents, while they are being used out of medical supervision and used in multiple doses with variable solubility [8]. The effects of AAS on oral health first was studied by Baily and Bruno in 1964; by studying the cariogenecity of Norethandrolone (anabolic agent) on the mouse teeth. They understood that Norethandrolone causes caries especially in molar teeth, by stimulating or increasing the cariogenic microflora of the mouth [9]. Meanwhile the effects of AAS on gingival tissues enlargement and maxillofacial overgrowth was studied and its discernable changes on the maxillofacial complex and gingival tissue was proven [10,11].

Methods and Material

The aim of this study was to determine the effects on anabolic agents on the oral health of male bodybuilders who have been using the anabolic agent for more than one year. 50 male bodybuilders were selected among the sports clubs of Tehran city. And a group of 50 athletes who were not using AAS (control group) was also studied.

Code of Ethics

Verbal consent was obtained from the athletes and they were reassured that the data would be kept strictly confidential. All participants were giv-en information about the purpose of the study. Participants' names were not recorded to assure confidentiality. This study was verified by the Tehran university of madecal scienes for code of ethics. In order, to verify the oral health of athletes, three indices were assessed: 1) DMF 2) PUFA and 3) OHI-S.

A simple questionnaire was also fulfilled to determine the personal habits of athletes; including questions about use of tooth brush, utilization of dental floss and mouthwash and the frequency of dentist visit. And the attitude of athlete about his oral health.

Results

The information provided by the questionnaire showed that there was no significant difference among the athletes participating in this study about habits like using tooth brush, dental floss and mouth wash; but the frequency of dentist visit among non AAS using athletes (control group) was more.

The table 1 (Fig.1) shows the use of tooth brush among athletes of both groups. As shown in the chart 44 athletes of all (100 athletes), brushed their teeth one time a day (before sleeping) including: 26 athletes of the AAS using group and 18 athletes of the control group, while 48 athletes brushed their teeth twice a day including 26 athletes of AAS using group and 22 athletes of the control group. Also there were 8 participants who did not brush their teeth regularly; including: 6 athletes of the AAS using group and 2 of the control group.

The frequency of dentist visit among the two groups of athletes showed difference between groups; supporting that the control group had dentist visit more frequently. Answers of participants were divided into four category: 1) when their teeth decayed 2) every six months 3) every year 4) irregular because of high cost of dentistry services. Answers of both groups are shown in Fig.2.

As shown in Fig.2 the majority of athletes (42% of control group and 66% of AAS using group) referred to dentist when they had a decayed tooth. But the six month referral was more in the control group as twice. While one year referral was the same among two groups; so it could be concluded that the non AAS using athletes referred to dentist more frequently.

The results of the three indices; DMFT, PUFA and OHI-S measured for the participants in this survey showed there was little difference between athletes of both group for DMFT and PUFA indices. In fact, these dental caries indices, showed no significant differences between athletes of both groups.

The data of three indices was analyzed by the SPSS software, the collected data had no normal distribution; so the mean rank was measured for three indices. The mean rank of OHI-S index showed that score of control group was 41.46 and AAS using group had the score of 59.36. ($P<0.01$).

Fig.3 shows the mean rank for three indices among both groups.

Use of brush / Group	Once a day No. (%)	Twice a day No. (%)	Irregular No. (%)
AAS using group	18	26	6
Control group	26	22	2

Table 1. Use of tooth brush among athletes, the table shows that 92% of athletes brushed once or twice a day (44% of the AAs using group and 48% of control group).

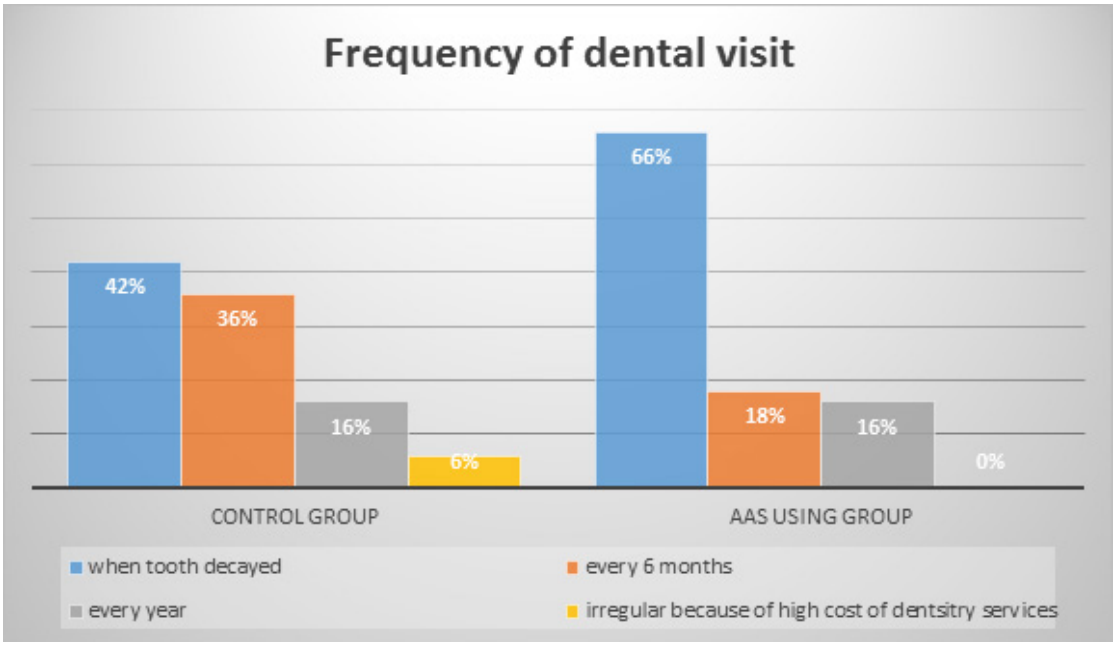

Fig .2. Frequency of dental visit among two groups of athletes (P<0.03).

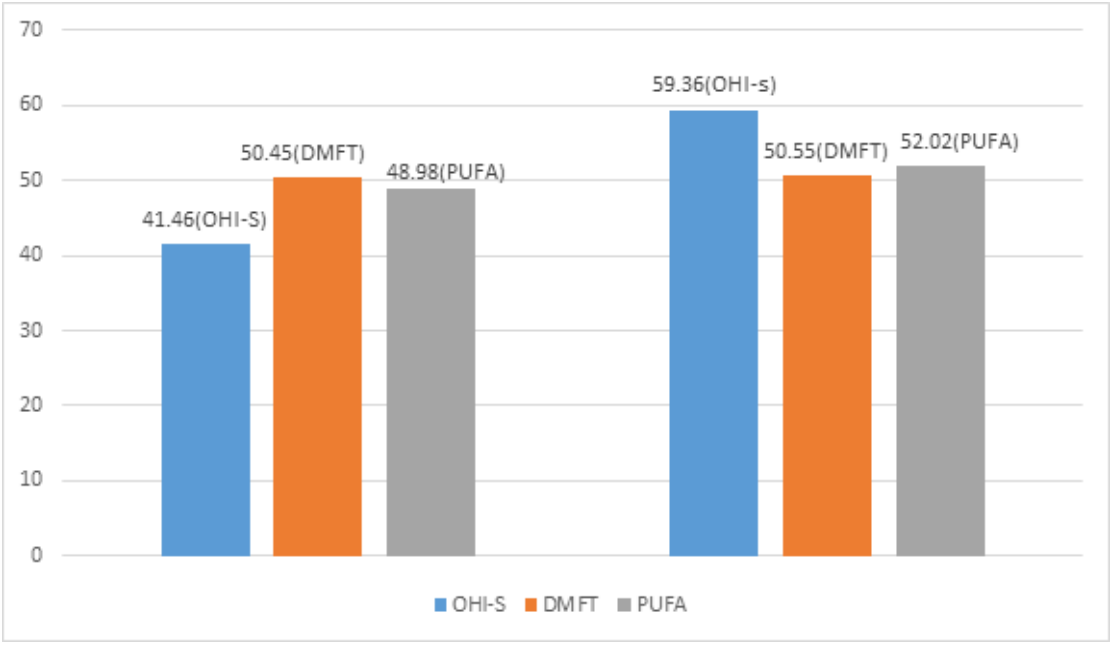

Fig. 3. Mean rank for three indices in control group (left) and AAS using group (right).

Discussion

Anabolic androgenic steroids are synthetic derivatives of testosterone hormone; which are now widely used among athletes in order to enhance body performance, improve physical image and increase strength. The effect of Supraphysiologic doses on the body organs have been studied; the aim of this study was to determine the effect of these anabolic agents on the oral health.

As previously discussed, there was no significant difference between athletes of both groups about personal habits like tooth brushing, using dental floss and mouthwash unless the participants of control group had dental visit more frequently. It can be concluded while the participants of this survey were chosen randomly, but there was similarity in personal habits such as tooth brushing, but the difference in dental visit showed that participants of control group paid more attention to their oral health. The shorter intervals' of dentist visit in the control group might be related to their socioeconomic class or their attitude about importance of oral health. As the category of "irregular visit because of high cost of dentistry services" was not chosen by the participants' of AAS using group; we may conclude that personal attitude of AAS using group about importance of oral health was different with the control group.

The analyze of the data by the SPSS software about the scores of three measured indices (DMFT,PUFA,OHI-S) showed no significant difference for dental caries indices; DMFT and PUFA. We may presume that AAS using athletes were at more risk of developing caries. As, the less frequent visit of AAS using athletes to the dentist could predispose them to developing caries, assuming that early lesions of caries can be detected and managed by dentist.

In addition, some studies like the survey of Baily and Bruno in 1964 showed the cariogenecity of the anabolic agent; Norethandrolone in molar teeth of mouse. In fact, Baily and Bruno had observed the cariogenecity of anabolic agents; and they tried to find the mechanism of cariogenecity by microbic depression in the animal study. While the results of their study showed that the number of caries lesion had decreased significantly; they concluded that the anabolic agent may increase or stimulate the cariogenic microflora of the mouth.

The analytical outcome of the scores for DMFT and PUFA showed no significant difference among the athletes of both groups (Fig.3). This could be due to the multifactorial nature of developing caries in human and the dynamic environment of humanmouth. As we know, one of factors with direct effect on caries development is "time". In the diagram of Keyes-Jordan, primarily three factors were considered to contribute to caries development: 1) Bacteria in biofilm 2) Tooth and 3) Diet. But the Factor of "Time" was then added. This shows that we should presume this factor and keep in mind that the caries development process may take different time for each person. On the other hand, the low age of AAS abuse among athletes has been proven by the studies, so if there was any possible effect of cariogenecity for the anabolic agent it may require a long term period of time for the survey.

Another limitation that we faced during the study was the abuse of several admixed anabolic agents out of medical supervision. So the dosage of each agent and time intervals were all dependent on the athlete himself. Having these factors all in mind we tried to do a survey to observe the possible caused changes in oral environment of athletes by doing a cross-sectional survey. The results of the survey, as discussed previously, showed no difference between athletes of both groups according to caries indices. But the difference was observed in OHI-S index, rating the high scores for AAS using athletes (Fig.3).

The high scores of OHI-S index for AAS using athletes showed that higher calculus and debris remained on the surfaces of their teeth; according to the scores and clinical observations the AAS using athletes had their meals in 5 or 6 times a day. So the possibility of calculus or debris removal was lower.

Conclusion

There was no difference between the athletes of control group and AAS using athletes according to the caries indices; DMFT and PUFA. But the AAS using athletes had higher scores for the OHI-S comparing to the control group.

Conflict of Interest

There is no conflict of interest to declare.

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