

The Influence of Oral Infectious Focus on the Physical Performance of an Athlete: Case Report

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Abstract

The influence of oral pathologies on sports performance seems to be clarified, but there are few case reports and research that show this relationship. The aim of the present case report was to show whether a localized oral infection could influence the results of physical tests in an athlete. Patient R.P., 37 years old, physical education teacher, swimmer, hiker and bodybuilder since he was 17 years old, sought emergency dental care due to painful symptoms in element 17. After radiographic examination, a periapical lesion was observed, through the probing, a periodontal pocket measuring 10 mm was observed in the distal and buccal region of this tooth and tooth 18. After the diagnosis of an infectious condition, the patient was proposed to perform pre and post-treatment physical tests at intervals of 30, 90 and 120 days: strength maximal bench press, resistance with 50% of the maximum load in the bench press, 100 meters free swimming and one-minute abdominal resistance applied by a physical education teacher. An extraction was performed. And the new tests were carried out. The physical tests performed show improvement 120 days after the extraction. The bench press maximal strength test had an improvement of 9.3%; the endurance test improved by 21.5%; the 100 meters swimming test obtained an improvement of 3% in the time obtained and in the abdominal resistance test there was an improvement of 10%. The patient reported that he looked like he had peaked during training 4 years ago, and this recent improvement surprised him. The improvement in all tests performed on an experienced athlete in a short period of time may allow us to assume a relationship of interference of dental infection in sports performance.

Keywords: Oral medicine • Athletic performance • Infection control • Dental • Periodontal index

Introduction

Keeping the body and mind healthy are premises for anyone who has the practice of sports incorporated into their daily lives. Pathological processes can decisively influence sports performance, with an inevitable drop in physical performance [1,2]. Oral problems such as cavities, periodontal disease, temporomandibular joint disorders, malocclusion and tooth loss can affect the athlete's triad food, training and rest causing a decrease in performance or even withdrawal of the athlete from training and competitions [3-6].

Oral diseases can directly interfere with the general health of the individual, as can be observed in different studies. Mattila, et al. reported the possibility that bacterial endotoxins from periodontal disease, or from another oral disease, may be related to a risk factor for myocardial infarction. Periodontal disease is an important way of feeding this mechanism. Janket, et al. discussed this aspect supported by the works of Choi, et al. and Li, et al. who verified in

immunological studies the link between the bacterium *Porphyromonas gingivalis*, exclusively resident in the oral cavity, and atherosclerosis [7-10].

The high prevalence of oral diseases transforms the mouth into a kind of deposit of microorganisms capable of propagating through the body and reaching organs and tissues of the body [11]. Infectious foci of dental origin should be eliminated immediately upon arrival of any patient for initial oral diagnosis for treatment purposes. An athlete must always be at the peak of his physical condition, and if there is an oral infectious focus supplying microorganisms to the bloodstream, muscle, shoulder and knee injuries may be more frequent and difficult to recover from [12]. For this reason, the first phase of treatment should be the clinician's primary focus in the initial treatment of an athlete patient.

The presence of microorganism can be observed from minimal gingival bleeding to the condition of sepsis, with bacterial invasion of

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the circulatory system with no report of painful symptoms in the teeth. In other words, this whole process can be silent and the patient (athlete) does not realize the reason for the impairment in their sports performance or the slowness in recovering from muscle or joint injuries. The objective of the present case report was to show a picture of localized oral infection and the results of physical tests obtained after the removal of the infectious agent in an athlete.

Case presentation

Patient R.P, male, 37 years old, swimmer, hiker and bodybuilder since the age of 17, sought emergency dental care due to painful symptoms in element 17. After radiographic examination a periapical lesion with a 10 mm periodontal pocket was diagnosed. in the distal region of that tooth. The patient had access to the free and informed consent form and agreed to disclose the images and results obtained. The patient has always been a sports practitioner and did not change his training routine throughout the treatment and evaluation times of this study.

The patient had no systemic involvement, underwent blood tests 15 days before the emergency consultation and all parameters were at normal levels. He reported that he had not been to the dentist for 18 months and that as a daily hygiene routine, he brushed 3 times a day and flossed most of the time, but without a routine of the time he flossed. He did not use mouthwashes.

The therapy chosen was to initially remove the acute pain, and scaling and root canal planing was performed. In the first consultation, only the sextant related to the tooth (17-14) was shaved subgingivally and a drug prescription with Amoxicillin 500 mg, every 8/8 hours for 5 days was used, with adequate oral hygiene instructions explained. The patient returned in 7 days, without symptoms since the day of the professional intervention and with the diagnosis of stage III, grade A chronic periodontitis [13]. 27 and 7 days later on all teeth of the lower arch. A new clinical examination and radiographic examination were performed 40 days after the periodontal procedures.

The pocket in element 17 had regression to 8 mm, however, the patient had great difficulty in performing local hygiene properly, and the accumulation of biofilm continued for the following three weeks, leading to a new local inflammatory/infectious condition. A complete periodontal clinical examination was performed with measurements of clinical periodontal level, plaque and bleeding index, and a new coronal radicular scaling was performed on the affected element.

	T ₁	T _{2-30 days}	T _{3-90 days}	T _{4-120 days}
PD (mm)	3,97 mm	3,15 mm	2,90 mm	3,11 mm
PI (%)	67%	45%	20%	22%
GI (%)	54%	32%	15%	18%

PD: Probing Deep, PI: Plaque Index, GI: Gingival Index

Table 1. Periodontal indexes in the period of 120 days.

The physical tests performed show improvement 120 days after the extraction (Table 2). The bench press maximal strength test had an improvement of 9.3%; the endurance test improved by 21.5%; the

However, due to the recurrence of inflammation and the difficulty of cleaning by the patient, extraction of this tooth was planned, since due to its retraction and position, daily plaque control was still compromised. The patient had a healthy systemic condition and no painful symptoms.

The following physical tests were applied pre and post-treatment of 30, 90 and 120 days: maximum strength in the bench press, resistance with 50% of the maximum load in the bench press, 100 meters free swimming and one-minute abdominal resistance by an education teacher physics. After warming up on a treadmill for 5 minutes, the patient performed the protocol suggested by Fleck and Kraemer, namely: Three attempts to reach maximum weight to perform a Maximum Repetition (1RM), with a 3-minute interval between the attempts [14]. The maximum weight was used to analyze the pre and post moments. After 48 hours of the 1RM analysis, the warm-up was repeated and at 50% of the maximum, the individual performed the maximum number of repetitions without pause, with speed controlled by a metronome, which was calibrated at 60 Bpm. For the 100 meters swimming test, a 25 meters pool was used with a water temperature of 30°C and the evaluated individual performed a warm-up in the liquid medium for 10 minutes. Then, after an interval of 2 minutes, an attempt was made to cover 100 meters in freestyle, using the crawl swimming. In order to determine abdominal resistance, the protocol by Pollock and Wilmore was followed, when a specific warm-up for the trunk and hip flexor muscles was oriented. After the test was explained by a physical education professional, the volunteer performed the largest possible number of repetitions of hip and trunk flexions in the supine position for one minute [15].

Subjected to dental care, a simple extraction of element 17 was performed, and in the postoperative period, non-steroidal anti-inflammatory drugs were prescribed for 3 days, every 12 hours; and after 7 days the suture was removed. After 30, 90 and 120 days, new physical tests and oral clinical examinations were performed [16].

Results

Periodontal clinical examinations and physical tests were performed in 4 phases: before extraction, 30, 90 and 120 days after removal of the infectious focus in element 17. Periodontal indices showed significant improvement over time, mean probing depth was reduced, dental plaque accumulation and gingival bleeding were reduced (Table 1).

100 meters swimming test obtained an improvement of 3% in the time obtained and in the abdominal resistance test there was an improvement of 10%.

	T ₁	T ₂ -30 days	T ₃ - 90 days	T ₄ -120 days
Maximum bench press strength (Kg)	110	114	116	120
Resistance with 50% of the 22 maximum load on the bench press (repetition)		23	27	28
100 meters freestyle swim (minutes)	1'10"15	1'9"56	1'9"47	1'8"23
1 minute abdominal resistance (repetition)	44	45	46	48

Table 2. Physical tests performed before and after tooth extraction and periodontal treatment.

Discussion

Infectious foci of dental origin must be eliminated immediately, when dental treatment begins. In the sports context, it is known that an athlete must always be at the peak of their physical conditions, and if there is an oral infectious focus providing microorganisms to the bloodstream, muscle, shoulder and knee injuries may be more frequent and difficult to recover from. Thus, the dentist must be meticulous in the search and immediate elimination of any infectious focus as soon as treatment is initiated.

In the case reported here, there was an initial intention to clean and maintain the infected tooth, but the bone support conditions observed and the patient's inability to perform daily hygiene were decisive for the treatment of choice to be extraction. In the first consultation performed, under painful symptoms and local infection, the patient reported that he used dental floss occasionally and that he maintained a twice daily brushing routine. After oral hygiene instructions, which were always reinforced in all consultations, the patient started flossing daily and reported that he now had a "clean feeling" and had no more bleeding when flossing.

Evidence suggests an impact of oral problems on the training and performance of athletes [17]. There are many potential challenges for athletes' oral health, including nutritional, oral dehydration, exercise-induced immune suppression, lack of awareness, negative health behaviors, and lack of prioritization. However, in theory, oral diseases are preventable by simple interventions with good evidence of efficacy.

Periodontal diseases, caused by lack of adequate hygiene, that is, accumulation of dental biofilm, stimulate the production of pro-inflammatory cytokines that cause several systemic problems [18]. The drop in income may be related to periodontal disease, which is sometimes neglected by non-specialist dentists.

Microbial markers, immunological status and sport characteristics are important for establishing guidelines for the management of training load in order to minimize physical stress and the risk of oral infection.

The improvement in oral condition in the case reported was clear consultation after consultation, and oral hygiene instructions were carried out without all patient follow-up sessions, and it was found that the ability to brush and floss was increased. The distal area of

the molars was the most critical area for cleaning, element 17 was the most affected, as it presented the greatest bone loss, and consequently the largest periodontal pocket, resulting in an unsurpassed difficulty in maintaining the region without inflammation and in periodontal health.

The choice of extraction may seem like an amputation for some professionals, and it really is, but in this case there was no other choice, otherwise the focus of infection would remain active in the patient. The certainty that the best therapeutic choice was made was confirmed with the results of physical tests after treatment. The improvement in all tests performed on an experienced athlete in a short period of time may allow us to suppose a relationship of influence of dental infection on sports performance. For an experienced athlete, the improvement of 10% or 20% is something very significant (get a reference), since there was no change in the training routine adopted by the patient 12 years ago. The patient reported that he looked like he had peaked during training 4 years ago, and this recent improvement surprised him.

This oral profile, in conjunction with the individual athlete's dietary needs, can be used to establish a treatment and preventive program, including oral health education. Measures such as awareness, adoption of preventive protocols, early diagnosis and treatment are extremely important to prevent the onset and worsening of oral pathologies.

In research carried out with Olympic athletes, it was found that, despite exhibiting high levels of performance and conditioning, their oral health was considered equal to or inferior to that of the general population. While some countries and federations have assistance programs, in others athletes are not able to pay for dental treatment. Another reason for neglect may be related to the fact that, in general, athletes were not educated about the importance of good oral health for their performance, and about the fact that regular maintenance of teeth and oral cavity is essential. vital to ensure good systemic health.

Conclusion

Maintaining the health of the oral cavity is extremely important for everyone. Inflammation/infection conditions can influence systemic processes of pathologies, acting in the increase of painful symptoms, changes in inflammatory markers and in injuries and wounds with delay in the recovery process. It is necessary to reflect on the fact that patients with mild gingival bleeding in some teeth after flossing may present an area of inflammation corresponding to 10 cm. Now,

this area in another region of the body, other than the oral cavity, would be an immediate target of medical concern, while the same extension of the affected area in the oral cavity does not always cause concern to the medical community, and athletes tend to consider it normal and isolated lesions in the oral cavity. This reality needs to be changed and sports dentistry must present itself, considering its multidisciplinary, educating the sports class on the best maintenance of oral health and the relationship with the recovery of existing pathological conditions.

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