The Saddle, in the Riding School and in the Dental Practice- An Analysis of Motion-Sequence and Function

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Abstract

The introduction of the saddle-chair in dentistry during the nineteen-eighties and nineteen-nineties was an instant hit. The chair is easily adjustable and creates the possibility to sit in a higher position (especially beneficial for the smaller dentist/ dental assistant) and sitting higher than the length of the lower-legs. Another advantage is to be able to sit with sloping-down lower-legs. The traditional working-chair did not have these advantages: one simply had to sit on the edge of the seat to create a higher sitting level. An adequate working-chair is simply a must, because the design of the patient-chair did not change much in the last fifty years. The patient-chair is equipped with i.e. a fixed backrest, a ditto seating- and leg-area and an adjustable headrest. Underneath the patient-chair's backrest is a certain amount of plating, from its centre sloping upwards to the sides and the upper part of the chair. If the patient-chair is in a flat position, there will be no room for the legs of the dental team and even the highest position of most of the patient-chairs will be too low for a long dentist. This design, in combination with the position of the headrest, will not facilitate the working posture of the dentist and the dental assistant. And if/ when the dental team is sitting in a 9h/11h position on a traditional working-chair, reaching the mouth of the patient will be at least an effort (the working chair being one with a horizontal or slightly forward tilting seat) [1]. This problem can be solved up to a certain degree by sitting higher than the length of the lower-legs. Sitting on a higher level is facilitated by the saddle-chair, and is probably an or one explanation for its' popularity.

Problem Analysis

What is required of a working-chair - given a healthy, correct working posture of the dentist- to facilitate working without physical complaints in a sitting position, and in what way will the saddle-chair contribute to this? For this purpose, an analysis is made of the human posture and movement(s) when one is sitting in a saddle on horseback as taught in riding-school, and the dentist's working posture and freedom of movement whilst sitting on a saddle-chair executing his fine motor skills.

Starting-Point: The Correct Way of Sitting An incorrect working-posture is the main cause of musculoskeletal disorder{s} [2-7] {Muscular-skeletal disorders caused by congenital and/or psychological problems are no subject matter of this article). A tenable physiological working-posture in sitting position is never fully worked out in literature. Desk-chairs are equipped with seats and backs facilitating leaning backwards per the consensual aim of avoiding physical overload. However, in dentistry it is impossible to work whilst leaning backwards. The consequences of static labour in sitting position are described in the ISO 11226 [8] Standard with directives concerning the maximal raising and bending of the head, trunk and limbs. In 1981 Hokwerda et al. [9] already declared the necessity of upright sitting to maintain a symmetrical working position. During the many ESDE congresses, via the first version of the Ergonomic Requirements of Dental Equipment 1and in information papers for students, an explanation has been given why the optimal physiologic posture when standing [10] is transferred or better superimposed upon sitting [11-13]. The research concerning the prism-glasses is also based on this symmetric working-posture [14,15]

Positive and Negative Aspects of the Use of a Saddle-Chair in Dentistry The positive aspects of the saddle-chair-compared to the traditional, straight working-chairs in the dental surgery are: • The user cannot slide off the seat. • It is possible to sit higher than the length of the lower-leg. • An apparent advantage for the dental assistant is the possibility to make swift, rotating movements, but these are compensated unfavourably in the lower back. The disadvantages of the saddle-chair however outnumber its benefits. The most important disadvantages are: • The permanent fixation of the upper-legs and the fixed stabilisation of the feet on the floor, resulting in a hyperlordotic lumbar change in the position of the spine. • The shape of the saddle-seat induces the upper-body to bend far more forward than acceptable according to the ISO-standard, resulting in physiological reactive mechanisms. Moreover, the necessary flexion of the head will lead to a second flexion in the spine on a high cervical level, disturbing he sensory information. • The compensations in the kinetic chain of movements will irrevocably lead to its over-burdening, resulting in complaints in the right - and left-hand side of the upper body. (spine, neck, shoulders, arms, hands). • The deflection of the lower jaw will lead to serious dysfunction (s) of the masticatory system. Most practitioners fail to recognize these functions as being the result of an incorrect sitting posture. • The lack of pelvic support; meaning a support with its point of impact on the Crista Iliaca Superior Posterior and thus sparing the back and the back-musculature. • Operating the foot-pedal induces shifting the seat-bones and in consequence shifting and overloading the sacroiliacal- joints and the lower back. In the article "Das

perpetuum Mobile der Muskel – SkelettBeschwerden" Engels and Hokwerda describe the vision on the sitting-posture according to the latest ergonomic viewpoints [2]. The conclusion is, that a working-chair must have a bipartite seating area; a short horizontal part at the back to be able to sit on the seat-bones, and a sloping-down frontal part supporting the upper-legs. In this case the freedom of movement of the upper- as well as the lower- legs is practically fully sustained. Superior. This principle differs from that of the backrest put against a bigger part of the back, thus inducing more pressure on the muscles or muscles and spine [30]. The pelvic rest should enable the body continually to get into- and hold the correct (ted) body-posture. These findings are methodologically confirmed in a survey by Mieke de Bruyne [31,32].

Conclusion A saddle is to be used on horseback, not in a dental surgery.