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## RESEARCH ARTICLE

### THE CHRISTENSEN PHENOMENON IN COMPLETE DENTURES CONSTRUCTION A CASE REPORT

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#### ABSTRACT

The objective of this presentation was to demonstrate the significance of the Christensen phenomenon in the construction of the complete denture. Little information was available regarding the influence of the Christensen phenomenon on cusp's angulation. The space that occurred between the upper and lower posterior teeth is called Christensen phenomenon. In order to avoid this phenomenon the curves Spee and Wilson must be constructed.

#### INTRODUCTION

A gap occurs in the natural dentition or between opposing flat occlusal rims. It can lead to instability in complete dentures, unless compensating curves are incorporated into the dentures. Only anterior dentition is in contact. The mandibular condyles are located on the tuberculum articulare incline. This is the sagittal Christensen phenomenon (Finn Tengs Christensen, 1958; Csoma, 1973) When the mandible is moved laterally (lateral occlusion) the teeth or wax contour are in contact only on the working side. A gap is formed on the balance side (transversal Christensen's phenomenon). The Christensen phenomenon should be included in the development of the occlusion particularly in the posterior segments of dentition. A registration of the condyle paths can be performed by means of a variety of intraoral and extra oral methods and the articulator adjusted accordingly. It is known that the baseplates pressure often cause pain. Thus the patient consciously or unconsciously attempts to alleviate this condition by moving the mandible forward or laterally (Friedman, 1951). The distance from a point on the mandibular occlusion rim to a point perpendicular to the maxillary occlusion rim is called Christensen distance.

This distance is found by multiplying the sine of Christensen angle ( $\gamma$ ) by the distance from the incisal point to the point in question from which the Christensen distance is to be measured. Taking the occlusal rim sagittal length as 50mm the Christensen distance at the end of occlusion rim can be expressed by the formula:  $S_m = 50 \sin \gamma$  [Finn Tengs Christensen, 1958]. The Christensen phenomenon can be avoided by the construction of the curve Spee in the anteroposterior plane. The curve Wilson is the curvature of the cusps of the teeth as projected on the frontal plane. That of the mandibular dental arch is concave and that of the maxillary dental arch is convex (Ohguri, 1999; Krishna Prasad, 2012). It was found that the sagittal and transversal phenomenon of Christensen was found to correlate with the structure of temporomandibular joints (Parilov, 1989). The objective of this study was to discuss the significance of the Christensen phenomenon in the construction of the complete dentures.

**Case presentation:** A 56 year old male patient presented to the Department of Prosthodontics of the Dental School of Athens with the chief complaint of difficulty in mastication. Medical history revealed that he was taking antihypertensive drugs. Extraoral examination revealed a reduced lower facial height and unsupported lips. On intraoral examination, he was found to be completely edentulous. He had been wearing complete dentures for six months. The vertical dimension was reduced. The complete dentures were mounted on an articulator, with a face-bow transfer.

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Figure 1.

The occlusal scheme was analyzed. The arranging of posterior teeth was not in the balance articulation. There was a space between opposing occlusal surfaces during mandibular protrusion (Figure 1). The space that occurred between the upper and lower posterior teeth, it was called the Christensen phenomenon. The curves of Spee and Wilson were not constructed. The occlusion plane was flat. We constructed the new complete dentures and the arranging maxillary and mandibular teeth to balanced articulation. The anteposterior curvature of the occlusal surfaces was beginning at the tip of the lower cusped and following the buccal cusp tips of the bicuspid and molars and continuing to the anterior border of the ramus. The curve of Wilson is the mediolateral curve that contacts the buccal and lingual cusp tips on each side of the arch. The insertion of the new dentures in the patient's mouth involved more than sealing the dentures and telling the patient to call us, if there was any trouble. During this early period, we advised him to masticate some types of food such as crackers, soft toast or chopped meat. After three months follow-up visits, the patient reported that there were no troubles with mastication.

## DISCUSSION

The goal of the complete denture treatment is restoring the patient to a state of normal functioning, health and esthetics. Numerous factors come together during various faces of complete denture construction. Artificial teeth must be placed in a position that will be esthetically acceptable to the patient and clinician, functionally sound and in harmony with the other structures of the masticatory systems. Since the last 70 years occlusal concepts have changed considerably. Prosthodontics now has the choice over essentially four occlusal concepts:

- Balanced articulation,
- Lingualized occlusion articulation,
- Linear Or monoplane occlusion and
- Neurocentric occlusion (Ortman, 1988)

The presentation of this case showed that there was not a balanced occlusion. The arrangement of the artificial posterior teeth didn't provide contacts between the opposing anterior and posterior teeth in centric relation and eccentric positions within the limits of normal function. The occlusal scheme was a monoplane occlusion. The denture occlusion didn't meet the balanced occlusion (Jones, 1972). During protrusive interocclusal records, distance between upper and lower posterior teeth was recorded (The Christensen phenomenon). The explanation of the Christensen phenomenon was that the occlusal plane is not parallel to condylar path (Friedman, 1951; Krishna Prasad, 2012; Ortman, 1988) Walker pointed out two fundamental errors in Bonwill's system: 1) The equalization of the cusp heights and 2) The parallelism of the plane occlusion with the condyle movement. Walker never found these planes to be parallel (Sönstebo, 1961). The Christensen phenomenon was presented in this case. The construction of the curves Spee and Wilson is useful. After three months follow-up visits, the patient reported that he no longer faced difficulties with mastication and speech.

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