



# JOURNAL of FORENSIC ODONTO-STOMATOLOGY

VOLUME 31 Supplement 1 October 2013  
Abstract book IOFOS Conference 2013 Firenze

## THE T-SCAN® SYSTEM A TOOL FOR FORENSIC SCIENCE

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The authors declare that they have no conflict of interest.

**Background:** The reliability of the T-SCAN® III Computerized Occlusion Analysis System (Tekscan Inc., South Boston, MA USA), as a method for occlusion analysis, is consensual among the field dentistry. This system allows accurate records of the time-sequencing and percentage of relative occlusal force between tooth occlusal contacts. This occlusion analysis system uses those variables for the diagnostic of mandibular dysfunctions. The T-SCAN® III System is easier to use than articulator dental reconstructions and simple to organize.

The aim of our study is to optimize the occlusal contact registration by T-SCAN® III System for forensic purpose.

**Material and Methods:** Fifteen patients from the Dental Clinic of Coimbra, Portugal, with ages between 21 and 30 years old, were randomly selected. The patient was finishing orthodontic treatment and voluntarily provided his contribution to the study. We used the position of maximum inter cuspidation because it allows for the major contacts between dental arcs. Out of 15 patients, forty-five intra-orally records were obtained by a pressure-mapping sensors in three different periods of time. Each record is a 2-dimensional dental arch, in which the occlusal contact forces are surrounded by a yellow outline that locates the contact, while illustrating in colors the differing of occlusal force levels. Occlusal contact data were analyzed in the parameters: bite length, position and force of tooth contact. The records from the same patient and from different patients, arbitrary choose, were analyzed to study overlapping areas. The analysis of variance within and between subjects was made. This analysis was made by Photoshop CS6® Software and SPSS® software.

**Results:** We obtained three records for each patient. Moreover, from those original records patient and between individuals, overlapping areas were selected. The results support that the largest number of contacts occurs in molar region. Those contacts allows the bigger overlapping areas and also there is an asymmetric distribution of forces in the same individual, left or right. The results show that the variability between subjects is significantly greater than variability within subjects.

**Discussion and Conclusion:** Within our sampling universe, we obtained one final record from overlapping areas for the same individual. We can get records from different individuals with the same number of contacts and with distinct position and shape. The oneness of dental arch and functional stomatognathic system leads to inter-individual differences in T-SCAN records. Our



*results support that it is possible for each subjects to be identified and distinguishes from another by T-SCAN record (98%). The authors conclude that the T-SCAN® III System is an important and a reliable tool for forensic science, for the purpose of identification and bite mark analysis.*

**KEYWORDS:** Forensic Odontology, Identification, T-Scan®.

JFOS. October 2013, Vol.31, Sup.No.1 Pag 51-52  
ISSN :2219-6749