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## Letter to the editor regarding “the relationship between oral tori and bite force,” published in the July ‘19 issue of *CRANIO*

Dear Editor,

This is in response to the article recently published in the July 2019 issue of *CRANIO*, on the relationship between oral tori and bite force by authors Chan-Woo Jeong et al. [1]. The article was well written and details a well-conducted study on the correlation between bite force and oral tori. However, I feel it is important to question the author’s decision to use Dental Prescale 50H, type R system (Dental Prescale; Fujifilm Co., Tokyo, Japan) for the application of accurately measuring relative bite force.

The Prescale system consists of pressure-sensitive sheets and analytical equipment (Occluzer FPD703; GC Corp., Tokyo, Japan). Two types of sheets are available: Type W (about 800  $\mu\text{m}$  thick) and Type R (97  $\mu\text{m}$  thick).

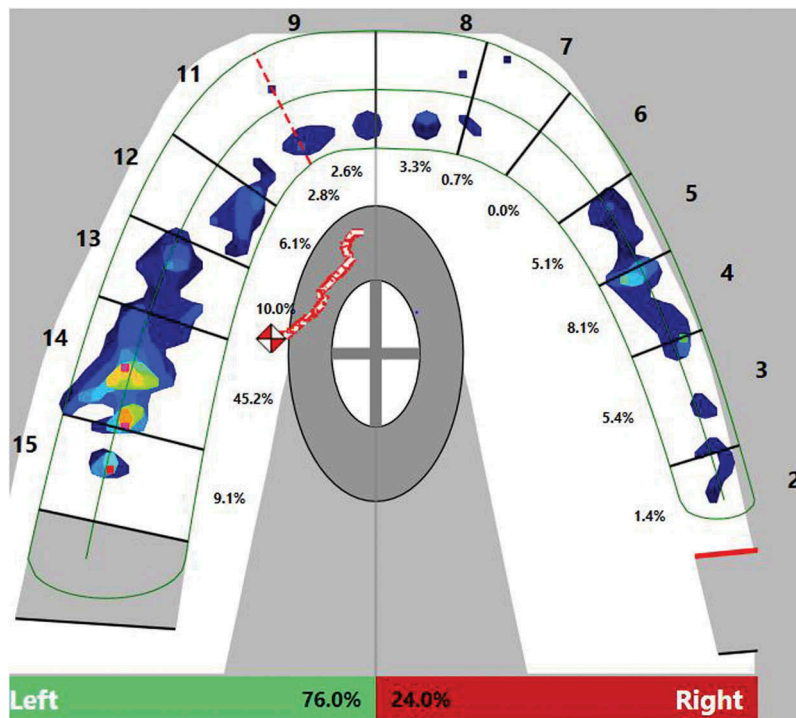
Both types of sheets are further divided into two subtypes: 30 H and 50 H. The 30 H sheet is used to record a range of 30–130  $\text{kgf}/\text{cm}^2$  and the 50 H sheet for a range of 50–1200  $\text{kgf}/\text{cm}^2$ . Each pressure-sensitive sheet consists of two polyethylene terephthalate films and numerous microcapsules containing a color-forming material between them. When bite force is applied, the microcapsules collapse, and the color formerly contained in the capsules leaks out to react with a developer and chemically forms a red color. According to the magnitude of the pressure applied, different densities of color are formed. With increasing pressure, the red color becomes more intense [2].

Essentially, the Dental Prescale system uses a color-based concept to identify increasing bite force. Increased force would mean increased dense color, which is then assigned a numerical value. But it lacks the capability to illustrate the temporal occlusal contact buildup sequence, permitting only one occlusal contact pattern to be recorded per measurement cycle, making it impossible to analyze multiple or successive intercuspations and requires extensive amounts of time to complete the gathering of the obtained occlusal data [3]. Prescale also does not comment on the relative right half and left half force pattern or percentage. It also cannot conclude the location of summation of the total bite force or illustrate the direction that the forces tract toward, all of which would be essential in understanding any occlusal force causality of oral tori.

In the present study conducted, it was stated by the authors that bite force magnitude was negatively correlated with presence or absence, size, and shape of torus palatinus and torus mandibularis. Due to its drawbacks in force descriptive capacity that Dental Prescale has in measuring complete arch bite force, Prescale’s use in this study does not appear to be completely justified. Furthermore, the extensive required time to process the data from a Prescale sheet [3] makes Dental Prescale impractical for clinicians to use intraorally, offering no real value to daily dental practice.

In the present context of the use of computerized occlusal analysis for relative bite force measurements, the T-Scan®10 system with its high definition (HD) recording sensor (Novus HD, Tekscan, Inc., S. Boston, MA, USA) offers both the simultaneous recording and representation of the force distribution throughout the dental arch relative to the maximum force exerted and displays the temporal resolution of the occlusal contact buildup sequence [4]. Hence, this device offers a more standardized measurement system for the understanding of bite force buildup and any correlation occlusal force may have in the causation of oral tori. The T-Scan® system has been shown in studies to accurately reproduce relative bite forces [5,6]. Compared to Prescale, there are many more descriptive force tools in the T-Scan® 10 software that would have possibly illustrated that a correlation exists between tori formation and bite force levels.

An example of a key T-Scan® software descriptive tool is the *Center of Force (COF) Icon* (Figure 1) that positions where, in the dental arch, excess occlusal force is concentrated. If the authors saw that the COF icon was located close to a few teeth that were also next to a buccal or lingual torus (or both buccal and lingual tori), excess force would be located to the portion of the dental arch where a tori had grown out of the bone. The high concentration of bite force noted in the COF icon’s position would indicate that overload occlusal pressure was constantly being applied to those few teeth near a torus (in Figure 1, teeth #s 15–13; #s 18–20) during chewing motions and any



**Figure 1.** The T-Scan's® COF Icon is located well to the left side of the dental arch, near teeth #s 13–15, and opposing teeth #s 18–20, illustrating a very large bite force imbalance of 76% left and 24% right. These few teeth could be near to a torus growth, whereby the excess force concentration was also near an existing torus.

parafunctional habits the patient may exhibit. The COF location would illustrate that a possible correlation of tori growth to bite force location summation did exist. But Prescale does not have a force summation software tool, so the authors could not know that excess bite force was summated where tori existed. As such, it is this reader's opinion that the author's conclusion should be brought into question, and their paper should reflect that other technologies exist that could better study this possible bite force/tori correlation.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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