

Table 1. Descriptive Analysis of Open-close Velocity without Splint (mm/s)

FIELD	N	MEAN	STD	SEM	MIN	MAX	SUM
Opmax	33	315.888	81.696	14.221	180.00	524.80	10424.30
Opave	33	144.691	29.022	5.052	89.300	222.30	4774.80
Clomax	33	369.818	80.869	14.078	188.800	537.60	12204.00
Cloave	33	182.473	31.486	5.481	122.700	266.50	6021.60
Termin	33	91.030	49.154	8.557	21.600	251.20	3004.00

Mean: mean velocity; STD: standard deviation; SEM: standard error of mean; MIN: minimum value of velocity; MAX: maximum value of velocity; SUM: summation of data

muscles during mandibular movement.

Occlusal Splint Fabrication

The occlusal splint used in this study was fabricated according to the criteria of the Michigan stabilization splint made of heat-cured acrylic (Premium Denture Acrylic, Lang Co. Wheeling, IL, USA). The splint was a full-coverage type with 2 mm of thickness at the incisor area. The splint was well adjusted to achieve a stable and even occlusal contact relation.

Procedures

Subjects were seated upright in a dental chair with no head rest. The labial surface of the mandibular incisors and gingivae were dried with sterilized gauze and the magnet (Myotronics Co. Seattle WA, USA) was stuck onto the labial surface of the teeth with Urehesive (Bristol-Myers Squibb Co. St. Louis, MO, USA) according to the operating manual. Great care was taken to prevent the interference of the magnet with the closing movement of the mandibular dentition. The magnet was placed on the lingual surface of the mandibular incisors alternatively in case of deep overbite subjects.

The photo 1 scheme of the K-6 system was first used to trace the trajectory of the jaw open-close motion in the sagittal and frontal planes during opening and closing movements of the mandible. The subjects were instructed to open and close the mandible as fast and as wide as possible. This was used as the baseline data to check whether the test subjects could open wide enough at the same magnitude in the subsequent experimental session. The photo 2 scheme of the K-6 system was used subsequently for recording the vertical velocity and frontal view of lateral deviation simultaneously during opening and closing movements.

The subject was instructed to perform ten continu-

ous open-close jaw motions as fast as possible. The subject wore a well-adjusted occlusal splint, which was 2 mm in thickness at the incisors area, and performed ten consecutive open-close jaw motions. All velocity records were stored on a disc for later analysis.

Data Analysis

All recorded data were stored and processed by Excel¹⁵ and Winks.⁴⁴ The means and the standard deviations of the ten consecutive open-close motion velocities were compared before and immediately after occlusal splint insertion by paired t-test.

RESULTS

Before Occlusal Splint Insertion

The mandibular open-close motion velocity varied from 180.0 mm/sec to 524.8 mm/sec in the maximum opening phase and ranged from 188.8 mm/sec to 537.6 mm/sec in the maximum closing phase before splint insertion (Table 1). In general, the maximum closing velocity (369.8 mm/sec) was faster than that of the maximum opening velocity (315.8 mm/sec).

After Occlusal Splint Insertion

The same trend in the open-close velocity after occlusal splint insertion was observed as that before occlusal splint insertion (Table 2). The velocity ranged from 150.4 mm/sec to 486.6 mm/sec in the maximal opening velocity and from 176.0 mm/sec to 502.4 mm/sec in the maximum closing velocity.

The maximum opening velocity of male subjects was faster than that of female ones before and after splint insertion ($P < 0.05$) (Tables 3 and 4). There was no difference of closing phase velocity between male