

# Efficacy of Open-Bite Treatment with the Thera-spoon

GREG R. BENNETT, DMD  
MARTIN WEINSTEIN, DMD, MS  
ALAN J. BORISLOW, DDS

**O**pen-bite malocclusions resulting from pervasive tongue habits can be corrected by various methods, including fixed appliances, removable appliances, and exercise regimens.<sup>1-3</sup> In the most severe cases of skeletal origin, surgery may be another option. The literature demonstrates both effectiveness<sup>4,5</sup> and ineffectiveness<sup>6,7</sup> of these methods, leaving the clinician with conflicting alternatives.

The purpose of this study was to compare two common methods of treatment of nonskeletal open bites caused by tongue habits: the fixed tongue crib and the Thera-spoon\* exercise program.

## Materials and Methods

The sample consisted of 17 consecutive anterior open-bite patients presenting for orthodontic treatment at the Albert Einstein Medical Center. Subjects were randomly assigned either to the experimental (Thera-spoon) or the control (tongue crib) group.

Thera-spoon patients were instructed to perform the exercise regimen five days per week, according to the manufacturer's instructions<sup>8</sup>

\*Health Concepts, Inc., Malvern, PA.

\*\*3M Unitek, 2724 S. Peck Road, Monrovia, CA 91016.

(Fig. 1). This therapy is intended to strengthen the orofacial muscles and promote balance of intra- and extraoral muscular forces.

Conventional tongue crib appliances, extending to the cingula of the mandibular incisors, were all fabricated by the same clinician (Fig. 2). They were attached to the maxillary first permanent molars with glass ionomer band cement.\*\*

All patients were recalled for clinical evaluations weekly during the first three months and then biweekly for the next three months.

Seven linear cephalometric measurements were used to evaluate the horizontal and vertical movement of the maxillary and mandibular cen-



Fig. 1 Thera-spoon devices used in exercise regimen.

Dr. Bennett is a resident, Dr. Weinstein is a faculty member, and Dr. Borislow is Chairman and Program Director, Division of Orthodontics, Maxwell S. Fogel Department of Dental Medicine, Albert Einstein Medical Center, Paley Building, Second Floor, 5501 Old York Road, Philadelphia, PA 19141.



Dr. Bennett



Dr. Weinstein



Dr. Borislow



**Fig. 2** Tongue crib cemented to maxillary first permanent molars and extended to cingula of mandibular incisors.

tral incisors<sup>9</sup>:

- Maxillary incisor to mandibular incisor
- Maxillary incisor to Frankfort horizontal
- Maxillary incisor to palatal plane
- Maxillary incisor to nasion perpendicular
- Mandibular incisor to Frankfort horizontal
- Mandibular incisor to mandibular plane
- Mandibular incisor to nasion perpendicular

Each pretreatment and six-month cephalometric radiograph was manually traced twice by the same operator over a three-day period, and the average of the two measurements was used. Model measurements from standard orthodontic study casts were also taken on two occasions within three days, rounded to the nearest .5mm, and averaged. The open bite was measured from the incisal edge of the most labially positioned maxillary central incisor to the incisal edge of the most labially positioned mandibular central incisor.

Median paired differences of the pre- vs.

post-treatment values within each group were compared at the 95% confidence level. Paired differences between the two groups were also evaluated at the 95% confidence level.

### Results

The results indicated significant differences between the two groups (Table 1). The tongue crib produced a complete closure of the anterior open bite, with a mean change of 2.13mm. On the other hand, the Thera-spoon group experienced only a mean 1.00mm of bite closure.

There was significantly more maxillary incisor extrusion in the tongue crib group (mean 2.63mm) than in the Thera-spoon group, which showed no vertical movement of the maxillary incisor relative to FH. The maxillary incisor was also extruded more relative to the palatal plane in the control group (mean 1.96mm) than in the experimental group (mean .13mm). The two groups demonstrated a similar amount of horizontal maxillary incisor movement relative to nasion perpendicular.

The mandibular incisor also exhibited more vertical change in the tongue crib group: a mean of 1.17mm relative to Frankfort horizontal, compared to a mean of -.25mm in the Thera-spoon group. The control group showed a greater degree of extrusion relative to the mandibular plane (mean 1.33mm) than in the experimental group (mean .13mm). There was little difference between the two groups in the amount of horizontal mandibular incisor movement relative to nasion perpendicular.

### Discussion

In this study, the fixed tongue crib produced significantly greater bite closure than the hand-held Thera-spoon did. Maxillary incisor

**TABLE 1**  
**LINEAR CHANGES DURING TREATMENT (MM)**

	Tongue Crib		Thera-spoon	
	Mean	S.D.	Mean	S.D.
Maxillary Incisor to Mandibular Incisor	1.00	0.71	2.13	1.45
Maxillary Incisor to FH	0.00	0.82	2.63	3.68
Maxillary Incisor to PP	0.13	0.63	1.96	2.23
Maxillary Incisor to NP	-0.25	0.87	-0.75	2.35
Mandibular Incisor to FH	-0.25	0.50	1.17	2.67
Mandibular Incisor to MP	0.13	1.03	1.33	1.81
Mandibular Incisor to NP	-0.25	0.50	0.29	1.05

extrusion appeared to contribute more than mandibular incisor movement to the bite closure.

Compliance was not an issue for the tongue crib patients, who had little difficulty adjusting to the fixed appliance. Although learning the Thera-spoon exercise regimen did not seem to be a problem, variable cooperation with the routine may have negatively affected the results achieved in the experimental group. The differences between the two groups may also be attributed to proper design of the tongue crib, which was extended to the cingula of the mandibular incisors.

Long-term stability of the anterior bite closure achieved by these two modalities remains to be determined.

**REFERENCES**

1. Safirstein, G.R. and Bruton, D.J.: Open-bite—A case report (1965-1982), *Am. J. Orthod.* 83:47-55, 1983.
2. Cangialosi, T.J.: Skeletal morphologic features of anterior open bite, *Am. J. Orthod.* 85:28-36, 1984.
3. Lowe, A.A.: Correlations between orofacial muscle activity and craniofacial morphology in a sample of control and anterior open-bite subjects, *Am. J. Orthod.* 78:89-98, 1980.
4. Fletcher, S.G.: Tongue thrust swallow, speech articulation, and age, *J. Speech Hear. Disord.* 26:201, 1961.
5. Swinehart, E.: A clinical study of open bite, *Am. J. Orthod. Oral Surg.* 28:18, 1942.
6. Mason, R. and Proffit, W.: The tongue thrust controversy: background and recommendations, *J. Speech Hear. Disord.* 39:115-132, 1974.
7. Swinehart, E.: A clinical study of open bite, *Am. J. Orthod. Oral Surg.* 28:18, 1942.
8. *Thera-spoon Manual*, Health Concepts, Inc., Malvern, PA.
9. McDonough, M.: Soft tissue changes and extraction treatment, research project, Albert Einstein Medical Center, Philadelphia, 1994.