

## Presenting characteristics and treatment outcomes for tongue lacerations in children

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### Abstract

**Purpose:** *Tongue lacerations in children require treatment decisions by clinicians, but there is conflicting literature on the topic of suturing.*

**Methods:** *In this prospective study, 28 patients (mean age  $3.0 \pm 2.3$  yr) with traumatic tongue lacerations were triaged according to an existing protocol to determine if the laceration would be sutured. At least 2 weeks post-trauma, 22 patients were evaluated by examination or report for quality of result and post-trauma complications. The most common location was anterior dorsum. A fall at home was the most common situation. Mean delay from injury to treatment was  $4.5 \pm 9.0$  h. No statistically significant difference was found for quality of result or post-trauma morbidity between those lacerations sutured and those not. No significant relationship was found between quality of result and size of laceration or bleeding at the time of presentation. Time delay did not significantly affect the quality of result.*

**Conclusion:** *Results suggest that suturing does not improve outcome or post-trauma course for tongue lacerations in young children. (Pediatr Dent 21:34-38, 1999)*

Tongue lacerations are common among intraoral soft-tissue injuries in children and can occur from falls or as penetrating injuries from sticks or other objects. Most commonly, these injuries occur when the tongue is between the teeth and a fall or blow occurs. Hemorrhage and disfigurement are the two most common concerns in these injuries, although loss of function, infection, and swelling that compromises the airway are also mentioned as sequelae.<sup>1-4</sup>

The largely anecdotal literature on tongue lacerations can confuse clinicians. Andreasen and Andreasen<sup>5</sup> suggest suturing both dorsum and lateral border injuries. Powers et al.<sup>6</sup> suggest loosely suturing tongue wounds and placing deep sutures in layers. Donat et al.<sup>3</sup> recommend suturing only wounds larger than 2 cm or when hemorrhage is a concern. English<sup>2</sup> agrees that small lacerations

need not be sutured when wound margins are in good approximation. Touloukian<sup>4</sup> warns that suturing may predispose the tongue to invasive, closed-space infection.

A tongue laceration in a child thus poses a management dilemma for the clinician—to suture or not. In a young child, when behavior management is an additional consideration, the dilemma is compounded because sedation or even general anesthesia may be required. The purpose of this report is to present a series of 28 children whose tongue lacerations were managed according to a protocol based on predetermined selection criteria. The presenting characteristics of the patient and injury, as well as the treatment rendered and its outcomes are described.

### Methods

This prospective study was conducted in the dental and emergency departments of Columbus Children's Hospital during the period August, 1996 through May, 1997. All tongue lacerations were treated by a pediatric dental or general practice resident according to a predetermined protocol which consisted of the following selection criteria for suturing: 1) wounds gaping (margins not approximated) when the tongue was in rest position, irrespective of wound location on the tongue, 2) lateral border wounds, and 3) wounds with active hemorrhage.

In addition, the treating clinician determined the necessity for patient restraint for disruptive behavior; type and route of local anesthetic when suturing was performed; suture type and number; and need for antibiotics. The clinician could also override the protocol if circumstances dictated. The length, width, and depth of the laceration (in millimeters) were measured using a graduated periodontal probe, and location and appearance were recorded on a standard form. Wounds were cleaned and débrided when needed in order to ascertain approximation and to place sutures. Basic demographics were obtained from registration data and compiled for later analysis.

**TABLE 1. DEMOGRAPHIC, SOCIAL, AND BEHAVIORAL CHARACTERISTICS**

<i>Characteristic</i>	<i>N*</i>			
<b>Gender</b>	(N=28)			
Male	18			
Female	10			
<b>Race</b>	(N=28)			
Caucasian	21			
Afro-American	7			
<b>Age (years) ± SD</b>	(N=28)			
	3.0 ± 2.3(range: < 1 to 9)			
<b>Immunizations</b>	(N=27)			
Up-to-date	27			
Not Up-to-date	0			
<b>Tetanus Booster &lt; 5 yr</b>	(N=26)			
Yes	26			
No	0			
<b>Cause of Injury</b>	(N=27)			
Fall	24			
Unknown	3			
<b>Site of Injury</b>	(N=26)			
Home	18			
Sports	5			
Motor Vehicle	3			
<b>Time Elapsed Since Injury</b>	(N=28)			
	(h)4.5 ± 9.0 (range: 0.5 to 48)			
<b>Frankl Rating<sup>7</sup></b>	(N=26)			
	<i>I (DN)</i>	<i>II (N)</i>	<i>III (P)</i>	<i>IV (DP)</i>
	15	1	3	7

\* Number of available cases for that characteristic.

The clinician rated the patient's behavior using the Frankl<sup>7</sup> scale at the completion of the emergency visit. Clinicians were not calibrated in behavioral rating, injury assessment, or post-trauma assessment, but used clinical judgment as they would in a treatment setting. However, the clinicians involved developed, piloted, revised, and agreed upon the protocol and data collection instrument prior to beginning the study.

At a minimum of 2 weeks post trauma, the quality of result and complications of the injury or treatment were assessed. When a patient failed the recall appointment, parents were called and asked to judge the clinical result. Quality of result included mutually exclusive categories of healing well, infected, scarring, or wound not evident. Parents were asked to describe post-trauma complications in the area of bleeding, dietary alteration, pain, and infection. Data were computerized and analyzed using basic descriptive statistics and chi-square.

**Results**

**Patient characteristics**

During the study period, 28 children (18 males and 10 females) presented with lacerations (or wounds) of the tongue. Twenty-one children were Caucasian and seven were Afro-American. The mean age was 3±2.3 years (range: younger than 1 to 9 years). Sixteen children exhibited negative behavior according to the Frankl scale (15, definitively negative; 1, negative); 10 positive (3, positive, 7, very positive); and two were not rated. Of the 28 children, 27 had up-to-date immunizations and 26 had received a tetanus booster within the last 5 years. The mean time since injury was 4.5±9 h. (range: 0.5 to 48 h). Most injuries occurred at home (64%) and as the result of a fall (75%). These and additional data are listed in Table 1.

**Wound characteristics**

The location of the wound was determined by dividing the tongue into sextants on both dorsal and ventral surfaces and classifying wounds by surface, border involvement, and if they were through-and-through. If the laceration crossed the midline, this was noted. Similarly, the size (length, width, and depth) was noted to determine future relationships with treatment and morbidity. The characteristics of the lacerations are portrayed in Table 2.

Only three of the lacerations were bleeding upon presentation. The most common location was the anterior dorsum of the tongue (54%). The next most common locations were the mid-dorsum and anterior ventrum with 29 and 21% of all lacerations,

**TABLE 2. PRESENTING CHARACTERISTICS OF TONGUE LACERATIONS**

Characteristic					N*
<i>Presents Bleeding</i>	<i>Yes</i>		<i>No</i>		27
	3	24			
<i>Location of Wound</i>	<i>Anterior</i>	<i>Middle</i>	<i>Posterior</i>	<i>Total†</i>	
	(Dorsal thirds)	15	8	4	27
	(Ventral thirds)		6	2	1
	Through and through Lateral border				5
					5
<i>Gaping at Rest</i>	<i>Yes</i>		<i>No</i>		27
	10	17			
<i>Wound Dimension</i>					
Length (mm)	13±7	(range: 3 to 35)			27
Width (mm)	2±3	(range: 0 to 15)			27
Depth (mm)	4±2	(range: 0 to 15)			27

\* Number of available cases for that characteristic.

† Some injuries involved multiple lacerations, so total exceeds N.

**TABLE 3. COMPARATIVE ANALYSES OF PRESENTING CHARACTERISTICS, TREATMENT, AND POST-TRAUMA MORBIDITY**

Variable	Bleeding on Presentation	Sutured or Not	Quality of Result
Time Elapsed			
Since Injury	—	—	NS
Length	—	—	NS
Width	—	—	NS
Depth	—	—	NS
Post-trauma Bleeding	—	NS	NS
Post-trauma Pain	—	NS	NS
Post-trauma Dietary Limitations	—	NS	NS
Quality of Result	NS	NS	—

NS=not significant at  $P \leq 0.05$  using chi-square analysis.

respectively. As one might expect, the frequency of injury decreased from anterior to posterior on both surfaces. Thirteen lesions crossed the midline.

Ten of 28 lacerations were gaping when the tongue was at rest. Seventeen more of the wounds were found

to gape or separate their wound margins upon protrusion of the tongue. Only five wounds were through-and-through injuries (dorsum to ventrum penetration) and only five involved the lateral border.

Wound dimensions varied greatly. Mean length was  $13 \pm 7$  mm (range: 3 to 35 mm). Width was considered the distance between margins at their widest point with the tongue at rest and averaged  $2 \pm 3$  mm (range: 0 to 15 mm). Tongue wounds that were open or gaped on protrusion averaged  $5 \pm 4$  mm (range: 1 to 20 mm). Depth from mucosal surface to the deepest point averaged  $4 \pm 2$  mm (range: 0 to 15 mm).

#### Treatment and post-trauma course

None of the patients, whether treated with sutures or not, received antibiotics. Seven children (mean age:  $2 \pm 1.7$  yr) required a restraint board for treatment. Of the original 28 lacerations, 22 were evaluated for result and post-trauma morbidity. Of the 22, 14 were viewed by a study investigator and eight by a parent familiar with the injury.

Only 10 lacerations met the criteria for suturing and these included four through-and-through wounds and three involving the lateral border of the tongue. Of these 10 treated lesions, five healed without scarring and four scarred, with one lost to recall. The four that scarred also had demonstrated gaping on protrusion and two had been through-and-through wounds. The average wound received about six sutures, most often size 4-0 chromic gut.

None of the patients experienced a post trauma infection requiring treatment, whether they received sutures or not. Post-trauma morbidity was minimal and no patient required retreatment or re-examination. Five patients experienced pain as reported by parents; three patients experienced continued bleeding; and two patient lost sutures within 24 hr of treatment. Eight parents reported that their child either had dietary difficulties or they had taken precautions with eating or drinking.

In order to determine the effectiveness of the protocol, to evaluate the predictive value of presenting characteristics, and to see any treatment effect, an analysis was performed comparing variables from presenting characteristics, treatment, and morbidity. Table 3 shows the variables correlated and the significance levels (*P* value of 0.05 was considered significant). No significant relationships were found when choice of management (suture versus not) was evaluated for quality of outcome or post-trauma morbidity. Similarly, the length, width, and depth of the wound had no significant relationship with the quality of outcome.

## Discussion

The purposes of this study were to describe the presenting characteristics of tongue lacerations in children and investigate relationships between these characteristics, treatment, and post-trauma morbidity. The literature offers vague and conflicting recommendations and is purely anecdotal. In most cases, as was shown in this study, the injury and sequelae are minor. Nonetheless, the clinician is faced with several decisions, not the least of which is whether to suture these injuries.

The demography of this sample suggests that a tongue laceration is most likely to occur at home from a fall in a young child. In our sample, when the decision was made to treat, the clinician often judged a restraint board necessary, most likely as a precaution, as the mean age of these children was about 3 years. Another finding which may impact on the decision to treat is the four and one half hours elapsed between the injury and presentation. The majority of the wounds had well-approximated margins and most had stopped hemorrhaging by presentation. Both suggest that the tongue laceration is often a self-limiting injury requiring little if any professional intervention. Although we did not record the extent or nature of interim emergency care provided by caretakers, we did note that many used combinations of pressure, cold, and inactivity to stop bleeding. These steps alone may be enough for many laceration injuries. The lack of any significant relationship between time elapsed since injury and quality of result suggests urgency may not be an important consideration. To the contrary, delaying definitive management may be desirable, because bleeding, a criterion for suturing, often stopped spontaneously.

The concern expressed about tongue infection from suturing<sup>4</sup> did not manifest at all in this sample and may be more of a consideration when wounds are contaminated or more extensive than seen here. No antibiotics were prescribed and, based on our results, this proved to be good treatment.

In an attempt to clarify the presenting criteria for selection of suturing, we tried to determine if lesion size predicted outcome and found no relationship between any dimensional characteristic and outcome. In other words, size did not predict a worse result. This result needs to be looked at with some caution because wounds in this study were often not linear or simple in appearance and measurements may have been compromised by the clinical site, child movement, and inadequate visibility.

Additional limitations of this study which should be considered are the lack of calibration of clinicians, sample size, follow-up period, and the subjectivity of some characteristics. For example, the quality of outcome was determined by gross clinical examination at follow-up and in eight cases, the determination was made by a parent rather than a clinician.

Several authors<sup>3,4</sup> have noted the tongue's ability to regenerate or rebulk after injury and for mucosal injuries to heal without scarring even if left alone. This observation held true as both clinicians and parents often expressed difficulty locating the site of the injury at follow-up. While the use of parents may be viewed as a design weakness, their satisfaction with the result is as important as the clinician's and we feel that their assessment is useful and valid.

Our results suggest that clinicians should not be in a hurry to suture wounds because doing so does not improve outcome nor reduce morbidity associated with this type of injury. Suturing did require use of restraint in seven instances and use of local anesthesia. The latter may have involved either mandibular block or local infiltration in the area of the wound which in itself may have accounted for hemostasis.

While not insuring a better result or post-trauma course, suturing does create an additional overlay of risk and management considerations. The admonitions to suture found in the literature<sup>3,5,6</sup> should be heeded with some caution. Our results point to a more conservative approach.

This study was a part of a continuous quality-improvement project at our hospital. As a result of our findings, we are less likely to suture and more likely to rely upon local measures to achieve hemostasis. We encourage clinicians to use caution in approaching tongue lacerations and to use good clinical judgment and risk-management principles in determining whether to place sutures in a young child.

## Conclusions

The conclusions of this study are the following:

1. Children who experienced tongue lacerations tended to be about 3 years old and injured at home in a fall.
2. No relationship was found between suturing of wounds and post-trauma morbidities.

3. Wound dimension did not predict quality of outcome.

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