

Technical note

Low-cost suturing training model for use in developing nations

Nakul Uppal^{a,*}, Sharon Saldanha^b

^a Dept. of Oral and Maxillofacial Surgery, Manipal College of Dental Sciences, Manipal University, Lighthouse Hill Road, Mangalore 575001, Karnataka, India

^b Dept. of Prosthodontics, Manipal College of Dental Sciences, Manipal University, Lighthouse Hill Road, Mangalore 575001, Karnataka, India

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Residency in oral and maxillofacial surgery requires competence in suturing. Texts that explain suturing techniques and videos that illustrate them are available.^{1,2} However, manual dexterity is achieved by practice, for which commercial models are available for a resident to train on before working on patients. It is also desirable to minimise the incidence of needle-stick injuries. In some units, acquiring commercially available models to train on may be hindered by cost. Foam also has a finite life, and ultimately needs replacement. Animal skin and waste meat from butchers are a useful option, but their procurement and storage in tropical climates may be difficult. We have therefore developed a suturing model with affordability as the priority.

Synthetic foam sponge was cut to size and covered with a layer of elastomeric impression material. A glass slab was used to impart a smooth surface and desired thinness to the skin analogue. The material sets within 5 min and easily peels off the glass slab. It can then be incised like tissue and sutured.

Light or medium elastomeric impression materials are suitable, as their low viscosity allows the material to flow into the foam, which creates a reliable mechanical bond after it sets. The rubbery nature and good tear strength of the elastomer mimic the elasticity and keratinised texture of skin, which offers suitable resistance to the passage of a surgical needle and suture material. The

interface between the elastomer and foam replicates the feel of skin over deeper connective tissues and is useful to master subcuticular sutures. If the model is fixed over a curved base it makes the “incised wound” gape, which permits an understanding of tension and the need for adequate bites of tissue to avoid a haematoma (Fig. 1). The consistency of the elastomer helps residents to appreciate the differences between round-bodied and cutting needles.

The idea of using models to train on is not unique, but our tissue simulator is easier to make because it requires only 2 materials and 10 minutes’ time for construction.³ There is evidence that suturing skills are superior after supervised practice on models.⁴

Improved dexterity from training on such a model should minimise the incidence of needlestick injuries and



Fig. 1. The gapping of an incised wound underscores the need to avoid dead space.

* Corresponding author. Tel.: +91 9845628027.

E-mail address: drnakul@gmail.com (N. Uppal).

obtain better results. Junior trainees find this training model useful before they are posted to work on-call at a trauma centre. In our unit it is compulsory to demonstrate competence in all suturing techniques as a preclinical exercise. Our model required US\$5 to make; commercial simulators are good, but may cost over 50 times as much. The easy availability of foam and elastomer impression material, together with quick preparation, make this suturing model suitable when a low-cost solution is desired.

References

1. Siervo S. *Suturing techniques in oral surgery*. Chicago: Quintessence; 2008.
2. Kneebone R, ApSimon D. *Suture tutor*. Version 1.4.0.29. © 2004 Medical Skills Limited.
3. Anwar M, Renner N, Harris M. A simple teaching model for mucoperiosteal flaps and suturing techniques. *Br Dent J* 1989;**166**:38.
4. Weaver JM, Lu M, McCloskey KL, Herndon ES, Tanaka W. Digital multimedia instruction enhances teaching oral and maxillofacial suturing. *J Calif Dent Assoc* 2009;**37**:859–62.