

## Commentary

### Understanding the fibula by the candle model

The article on “Understanding the Fibula by the Candle Model”<sup>[1]</sup> is an attempt to simplify the planning of some of the steps of the fibula osteocutaneous flap for reconstruction of mandibular defects.

The complexities involved in a fibula flap used for mandibular reconstruction are mainly due to the fact that:

- The bony reconstruction is three-dimensional, requiring contouring of a straight bone to reproduce the missing contoured mandibular segment, after segmentalising it
- The associated skin flap/soft tissue requirement is variable and has to be tailored to each individual case.

The actual issues involved are:

- Length of bone required
- Number and actual sites of the osteotomies to be performed to achieve a good contour and
- Position, shape and size of the skin paddle(s) in composite defects.

Other factors like location of the perforator(s), exit side of the pedicle (anterior or posterior) and length of the pedicle required (and, therefore, the amount of proximal bone that can be discarded) also influence the planning, but are less crucial in terms of the contour of the neomandible.

The candle model is a useful tool in understanding the surfaces of the fibula, location of the pedicle and muscle attachment and, therefore, a good training aid for teaching purposes, especially for illustrating the steps involved for beginners. However, extrapolating this to conclude that it “gives better aesthetic outcomes in terms of contour, width and projection” in the clinical operative setting is not justified from the data provided in the latter.

Why is this so?

The actual raising of the flap varies in each case only in the siting of the skin paddle and its orientation to the fibula (longitudinal, transverse, oblique, second paddle, etc.).

- The “carpentry” of the fibula flap is performed either
- in situ*, before detachment from the leg or
  - after detachment, in the head and neck area.<sup>[2]</sup>

In practical terms, the latter is easier but increases the ischemia time. The former saves ischemia time, but this is not a significant issue in a bone–skin flap. When the detached flap is placed adjacent to the plated defect in the mandible, the osteotomy sites become quite obvious and can be marked out quite easily, particularly giving allowance for the perforator emerging site and length of the osteotomised segments. These may need change intraoperatively when the bony and soft tissue (mucosa and soft tissue) defects have to be revised for oncological reasons.

Thus, it becomes obvious that the usefulness of any model is in giving an approximate idea of the dimensions of the components of the flap and their location vis-à-vis each other in the operative setting.

In terms of the above factors outlined and the fact that the candle model is a pre-operative tool and not a sterile intraoperative template, it is mainly as a teaching aid that it can help beginners to have a better understanding of anatomy, orientation and approach. To some extent, it can also guide the surgeon in planning the skin paddles in relation to the bone segment. However, one should be wary of expecting to copy the “guide,” as it were, exactly on to the flap and hope for the flap to fall in place like a jig saw puzzle for the reasons mentioned above.

While the authors mention it as a cheaper alternative to other options like the stereolithographic model, it is a well known fact that most surgeons who perform a large number of these flaps do not take recourse to such aids as a routine.

**Shivaram Bharadwaj**

Apollo Hospitals, Chennai, India.

**Address for correspondence:**

Dr. Shivaram Bharadwaj, Apollo Hospitals, Chennai, India.

E-mail: [surgeonshiva@gmail.com](mailto:surgeonshiva@gmail.com)

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