The creation of PlayDoh® models as an educational tool for teaching anatomy of the lips and peri-oral musculature

BY PETER STEELE, MARK DEVLIN AND JEFF DOWNIE

As lip procedures continue to be popular it is essential that all practitioners have a detailed knowledge of the anatomy of the area. The authors outline an innovative and engaging method of teaching.

Detailed knowledge of the soft tissue anatomy of the oral cavity is essential for all practitioners performing reconstructive or aesthetic procedures in this region. The technique of using modelling clay or dough as a teaching aid has been utilised in the field of oculoplastic surgery to demonstrate the anatomy of the eyeball and eyelid [1-3]. Active learning, whereby students participate in the processes has been shown to have advantages over passive teaching methods [4,5]. We present a step by step method of constructing a model of the lips and peri-oral musculature that has been trialled during anatomy for aesthetic practitioner courses.

Background

When we teach anatomy to groups of clinicians of different backgrounds and / or training it can be difficult to engage them all equally. Whilst themed teaching sessions based upon prior experience and training can be an effective way of delivering this, we wanted to consider an approach that could engage all colleagues. This allows for larger group teaching. It can also be fun which can also be a motivating factor in active learning.

Active Learning is generally defined as any instructional method that engages students directly in the learning process rather that the traditional passive learning techniques, e.g. lecture and slideshow.

"We believe that learning can, and should, be fun"

Method

During organised anatomy teaching sessions we have piloted the use of active learning using modelling dough. This is commercially and readily available. The teaching session involves an interactive demonstration to build an anatomical model of a chosen area of anatomy. In this paper we demonstrate a model of the lips and perioral region.

The dough comes in a variety of colours allowing for the different types of tissue to be differentiated from one another.

By building this in layers from deep to superficial the participant can appreciate the 3-dimensional relationships of the various anatomical structures. The depth of structures within tissues is more easily understood. This knowledge is reinforced by the active construction of the anatomical model and we feel that this is superior when compared to a more didactic approach.

The willingness of participants to take part can be variable and this can be a barrier to engagement in these, and similar, forms of teaching. By forming teams within the student group we have found a greater degree of involvement. By introducing a competitive element, i.e. judging of the models, we have also experienced greater engagement. We believe that learning can, and should, be fun.

Discussion

Understanding of anatomy is critical for both surgeons and aesthetic practitioners.

It is particularly important within an aesthetic practice for improving the efficacy of treatments and for the avoidance of complications. Understanding anatomy enables the practitioner to optimally manipulate tissues whilst avoiding damage to critical structures.

This technique can be applied to any number of anatomical areas and teaching environments. It is inexpensive and effective. We are currently developing this technique as a routine segment within our cadaveric anatomy teaching sessions.

In this paper we demonstrate a model of the lips and perioral region being constructed. As this develops, from deep to superficial, the students have a greater appreciation of key structures and their relationship to one another. Of particular value in this model are a number of key relationships which we have found to be of interest to aesthetic practitioners.

The depth and course of the labial arteries and their relationship to the orbicularis oris and the modiolus are easily appreciated when building this model. The relationship between the elevator and depressor muscles of the lips, and the complex way in which they relate to the orbicularis, are also more easily understood when employing this methodology. The following series of images demonstrate the step by step construction of an anatomical model of the lips and perioral region.

Buccal mucosa (Figure 1)

Start by rolling out pink clay into a flat sheet in a roughly circular shape the diameter of which will be basis for the overall size of the model. This represents the buccal mucosa on the inner aspect of the lips and mouth. Cut an ellipse from the centre of the circle to represent the oral vestibule.

Minor salivary glands and buccinator (Figure 2)

Add two purple sheets of clay onto the buccal mucosa. These sheets represent the

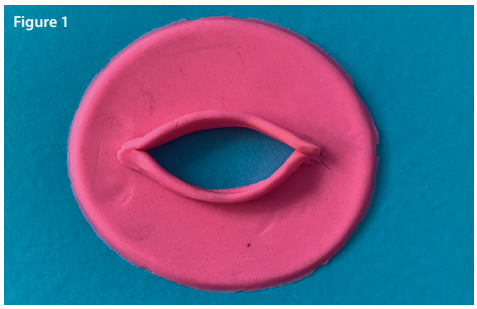
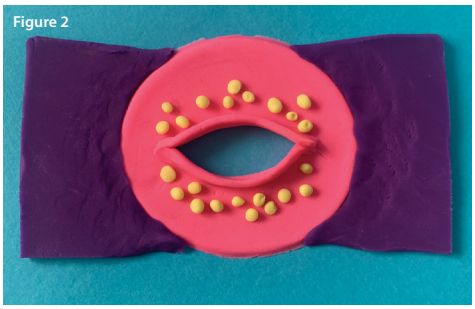


Figure 1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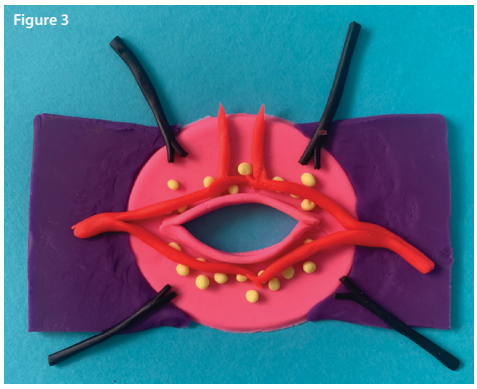
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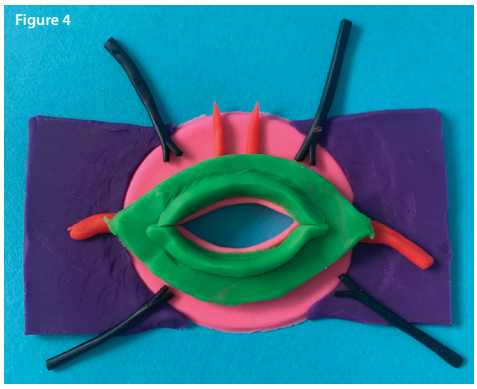
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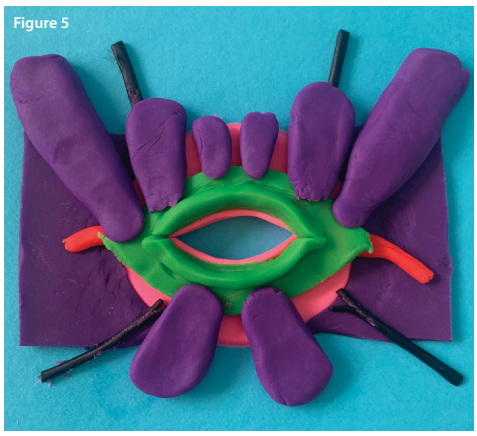
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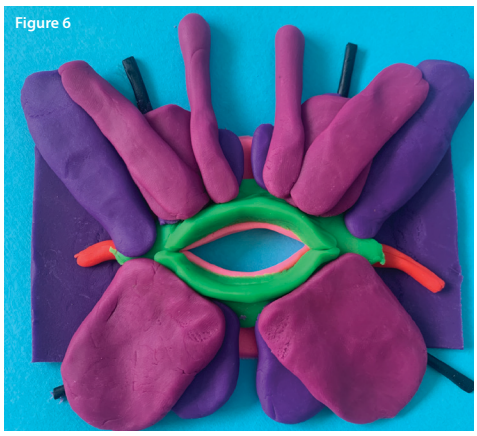


Figure 6

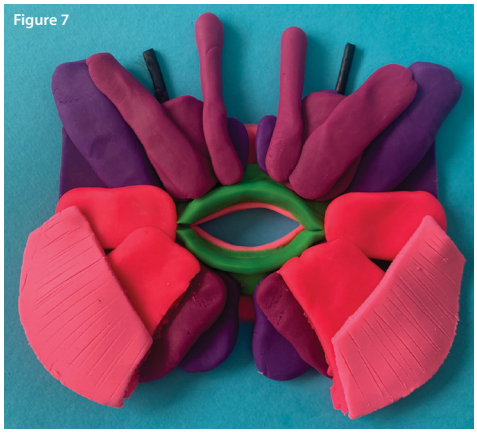


Figure 7

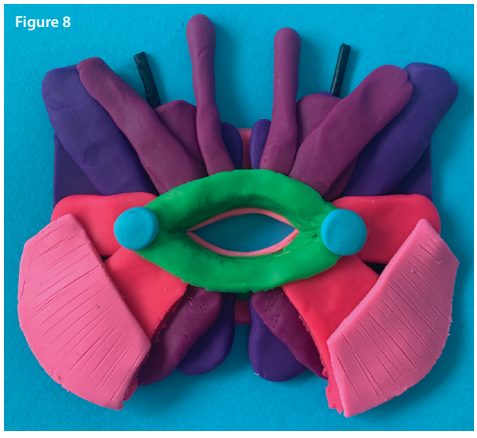


Figure 8

buccinator muscles which blend with the lips and orbicularis oris muscle.

Scatter some small pieces of yellow clay on top of the buccal mucosa to represent the numerous minor salivary glands present in the inner aspects of the lips.

Labial arteries and the neuro-vascular arcade (Figure 3)

In red clay we represent the vascular arcade comprising the superior and inferior labial arteries originating from the bifurcating facial artery and two smaller paired vessels in the midline representing the columellar arteries.

In black we represent the infraorbital nerve superiorly and mental nerve inferiorly. these are both sensory branches of the trigeminal cranial nerve (Vb and Vc) and innervate the skin and mucosa around the mouth.

Deep orbicularis oris (Figure 4)

Roll out an ellipse of green clay to represent the deep orbicularis oris muscle. Place this over the labial arteries and oral vestibule.

Deep musculature (Figure 5)

The perioral muscles can be built up in three distinct layers to allow the participant to understand the 3D interaction with the orbicularis oris.

Here we represent the deep layer of perioral muscles in dark purple clay. The muscles in the lower group are the mentalis muscles.

Superiorly and laterally we see zygomaticus major which is a key landmark in the mid-face, adjacent lies levator angulii oris and medially the paired depressor septi nasi.

Intermediate musculature (Figure 6)

To represent the intermediate layer of perioral muscles we have used lighter purple clay. Superiorly we have added zygomaticus minor, levator labii superioris and levator labii superioris alaque nasi.

Inferiorly add depressor labii inferioris partially covering the mentalis muscles.

Superficial musculature (Figure 7)

To represent the superficial layer of perioral muscles we have used light pink clay.

Lying over the buccinator muscle and covering the bifurcation of the facial artery add risorius muscles inserting into the corner of the mouth.

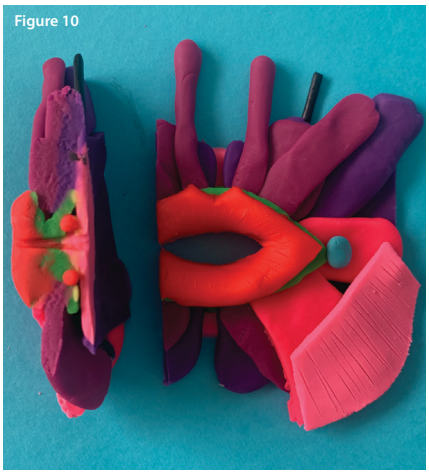
Inferiorly add depressor angulii oris and platysma which blend together into the orbicularis oris.

The modiolus and superficial orbicularis oris (Figure 8)

Bind all of the perioral muscles together with a cap of orbicularis oris, again represented with green clay in this model then add two small spheres of blue clay to represent the key structure of the modiolus.

Figure 9

Figure 10



The surface (Figure 9)

Finally, add some red clay and shape it to form the lips. The model can now be studied to understand the layers created.

The surface sectioned (Figure 10)

Now that we have created our 3D model we can section it to review the anatomy. This final photograph demonstrates the relationship of the labial arteries (shown in red) which lie on the inner aspect of the lips below the obicularis oris muscle and just above the mucosal surface.

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