



Objective:

This lab aims to introduce students to dental morphology and familiarize them with metric methods for investigating teeth (and other skeletal elements). Through completion of this exercise, students will also critically consider the role that body size plays in comparisons of skeletal observations, as well as quantify and visualize the non-binary nature of sexual dimorphism as expressed via our teeth.

Materials:

- 1 piece ‘Dubble Bubble’ gum
- Vernier calipers
- Graph Paper
- Multi coloured pens/pencils

Method:

- 1) Think about the composition (‘population’) of this class
 - a. Do you expect that some students will have larger teeth? Smaller teeth? Why?
 - b. Does everyone have the same types and orders of teeth? Why/Why not? Are some missing? Which ones?
- 2) Using the *Dubble Bubble* gum provided, make an impression of your LEFT maxillary and mandibular first molar teeth (LM1).
 - a. Hint: It might be best to first flatten the gum (if it’s a rounder piece). Next, bite solidly and firmly into the gum to make the impression. Do not chew the gum first, or it will become too soft and the dental impression will not properly hold.
- 3) Practice identifying and naming the tooth cusps from your dental impression!

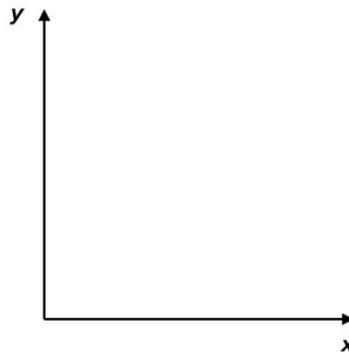
	Maxillary	Mandibular
Mesio-buccal cusp		
Mesio-lingual cusp		
Distal-buccal cusp		
Distal-lingual cusp		
Other?		

- 4) Use Vernier calipers to measure the mesio-distal and buccal-lingual dimensions of your maxillary and mandibular M1s (mm) (as impressed on the Double Bubble gum).
- a. Hint: For a good recap of how to read standard Vernier callipers, see this youtube video: <https://www.youtube.com/watch?v=vkPlzmalvN4&vl=en>
- 5) Make a chart that includes the following column headings, and record your observations (and the observations of the other people in your group):

Observer ID	Gender*	Your stature (cm)	Raw Measurements				Measures Corrected by Stature			
			Maxillary M1 (Left)		Mandibular M1 (Left)		Maxillary M1 (Left)		Mandibular M1 (Left)	
			Mesio-distal diameter	Bucco-lingual diameter	Mesio-distal diameter	Bucco-lingual diameter	Mesio-distal diameter	Bucco-lingual diameter	Mesio-distal diameter	Bucco-lingual diameter

*remember that gender and sex aren't synonymous, but because we are working with us, living humans, we'll use gender here. If you were to study these attributes in skeletons, sex may be a better variable.

- 6) Account for body size differences in your tooth crown dimensions by dividing each tooth measurement by your stature and multiplying by 100.
- 7) Agree on a scale for your graphs, and create two scatterplots using the data you've collected: one for the raw tooth measurements, one for the tooth measurements corrected by stature. Label the x-axis as 'mesio-distal diameter (mm)' and the y-axis as 'bucco-lingual diameter (mm)'. Colour code your data points by gender (does not need to be binary!).
- a. Have a look at the sample plot from Hawks et al. (2017) at this [link](#) and below for an example of how this data may be used in bioanthropology.



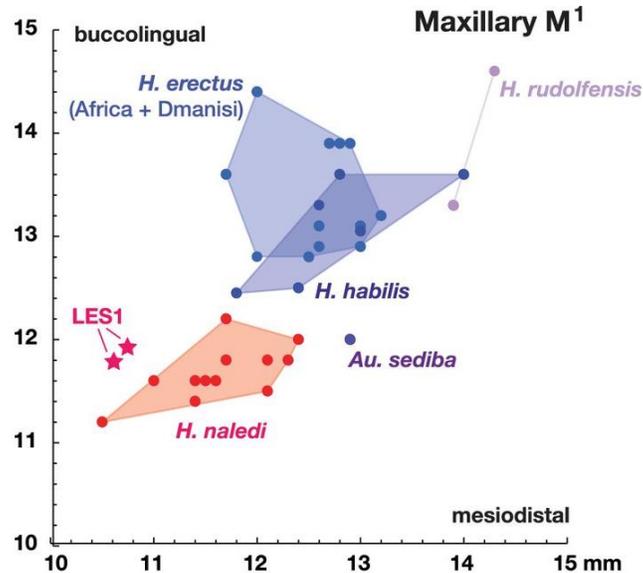


Chart from Hawks et al. (2017) at: <https://elifesciences.org/articles/24232>

- 8) Work together to compare and contrast the graphs you have made. **Discuss** the following:
- Is there a linear relationship between mesio-distal and bucco-lingual tooth dimensions?
 - What factors seem to influence the shape and size of tooth crowns?
 - Is there a relationship between tooth crown shape/size and gender/sex? Describe.
 - How does correcting for stature (body size) change the outcomes/plots (if at all)?
 - Do you have any outlying tooth values? What might explain these?
 - Discuss the factors that could explain the variation you have observed in your group and classmate's dentition?
 - How could you use this type of data to answer bioarchaeological questions using skeletal material? What limitations may you encounter?