INTRODUCTION:

The topics covered today are:

- What is a Mouthguard?
- Requirements of a Mouthguard.
- Desirable properties of a Mouthguard.
- Types of Mouthguards.
- Functions of Mouthguards.
- Model preparation for Mouthguards.
- Advantages of thermoformed Mouthguards.
- Where mouthguards are used?
- Materials that are used in a dental laboratory that are suitable for constructing Mouthguards.
- Advantages of Laminating Mouthguards.
- Steps in constructing a Custom Mouthguard.
Mouthguards

A mouthguard is designed to protect the teeth as well as the Maxilla, Mandible and the temporal mandibular joint of the wearer.

To achieve this there are certain requirements that the mouthguard must have:

1. The mouthguard must have close contact to the teeth and tissue surfaces.

2. The mouthguard must be comfortable for the wearer.

3. The mouthguard must be made of a strong but flexible material.

There are also some desirable properties that the mouthguard may have:

1. The mouthguard may be coloured.

2. The mouthguard may have more than one layer of thickness (laminated).
Types of Mouth guards:

- **Stock:** available at sporting stores, limited sizes, inexpensive, poor protection and fit, does not cover all teeth and tissue correctly

- **Boil-and-Bite:** available over the counter, limited sizes, it is mouth formed by immersing the mouthguard into boiling water than inserting into the mouth, inexpensive, poor protection, does not cover all teeth and tissue correctly, fits better than stock mouthguard.
• **Vacuum formed** (custom Made): made in the laboratory on a stone model, fits well, many colours available, superior to both **Stock, Boil-and-Bite** mouthguards in fit and protection, adequate for single layer mouthguards.

![Vacuum formed example](image1)

• **Pressure formed** (custom made): made in the laboratory on a stone model, fit, retention, protection, lamination, dimensional stability are superior to all other mouthguards because of the great amount of pressure generated by the thermoforming machine.

![Pressure formed examples](image2)
Functions of Mouthguards:

- Protects the natural teeth from external impact by the opposing teeth.

- Must be a firm and comfortable fit for the patient.

- Should allow the wearer to talk and breathe freely.

- Does not impinge on frenum or on any oral muscles.

- Must be soft, durable and tasteless and have sufficient thickness of 2-4mm.

- Mouthguard material must be easy to maintain.

- Protects the soft tissue, bone structures and temporal mandibular joint. (TMJ)

- Diminishes the incidence of concussion.

- Provides high impact absorption and distribution throughout the entire mouthguard.
Model preparation for mouthguards:

- Read and interpret the work order.
- Remove any bubbles or defects from the model.
- Trim shape model and remove any sharp edges.
- Draw or scribe the design onto the model.
- Give adequate clearance to all frena.
- Soak and paint sodium alginate onto the model to stop the hot thermoplastic from sticking to it.

Advantages of a thermoformed mouthguard compared to a “boil and bite” mouthguard.

- The mouthguard may be coloured.
- The mouthguard may have more than one layer of thickness.
- The mouthguard fits and is adapted well. (custom made)
- The mouthguard may have text inserted.
Where would mouthguards be used?

CONTACT SPORTS

- Football
- Basketball
- Boxing
- Martial arts
- Squash
- Hockey

Materials that are used in a dental laboratory that are suitable for constructing Mouthguards.

The material used is a thermoplastic, which is firm and flexible.

- Poly Vinyl acetate PVA
- Ethyl Vinyl acetate EVA
Why do we laminate?

• To provide greater protection by being able to absorb and disperse external trauma.

• To increase incisal area thickness.

• To reinforce between layers.

• To allow text to be inserted.

ADVANTAGES OF LAMINATING

• To provide greater protection by being able to absorb and disperse external trauma.

• To increase incisal area thickness.

• To reinforce between layers.

• To allow text to be inserted.
STEPS IN CONSTRUCTING A CUSTOM MOUTHGUARD

• Read Schedule H form

• Trim base of model flat and remove any voids or sharp edges

• Draw design, for opaque materials the outline may be scribed onto the model

• Scribe finish line into palate region

• Soak or paint with Sodium Alginate (separator)

• Position the model in the machine so that there is more space for the anterior section of the model

• Heat foil, adapt and allow to cool

• Trim foil just short of drawn design (scissors or hot scalpel) be careful not to distort the foil

• Continue fine trimming with a micro motor (round off all peripheries and relieve each frenum)

You have now completed a basic custom mouthguard
The next steps are required to produce a LAMINATED mouthguard

- Taper peripheries (for comfort and better adaptation of second layer)
- Shape the mouthguard to reduce the possibility of trapping air between layers
- Clean first layer and place graphics or text onto it rounded
- Place back onto thermoforming machine and adapt final layer
- Heat foil, adapt and allow to cool
- Trim final layer, use first layer as your guide, make sure the peripheries are smooth and rounded

You have now completed a LAMINATED custom mouthguard
OUTCOME:

You should now be able to know the following:

- What is a Mouthguard?
- What are the Requirements of a Mouthguard?
- What are the Desirable properties of a Mouthguard?
- The different Types of Mouthguards.
- The Functions of Mouthguards.
- The Model preparation for Mouthguards.
- The Advantages of thermoformed Mouthguards.
- Where mouthguards are used?
- What are the Materials that are used in a dental laboratory that are suitable for constructing Mouthguards?
- The Advantages of Laminating Mouthguards.
- The Steps in constructing a Custom Mouthguard.