Stalked Jellyfish (Staurozoa)
&
Mirabilis Jalapa (Four-o-Clocks)

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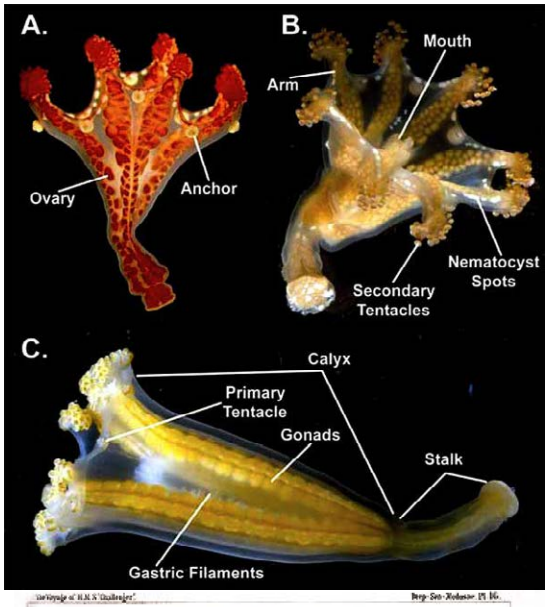
Underlying Principles

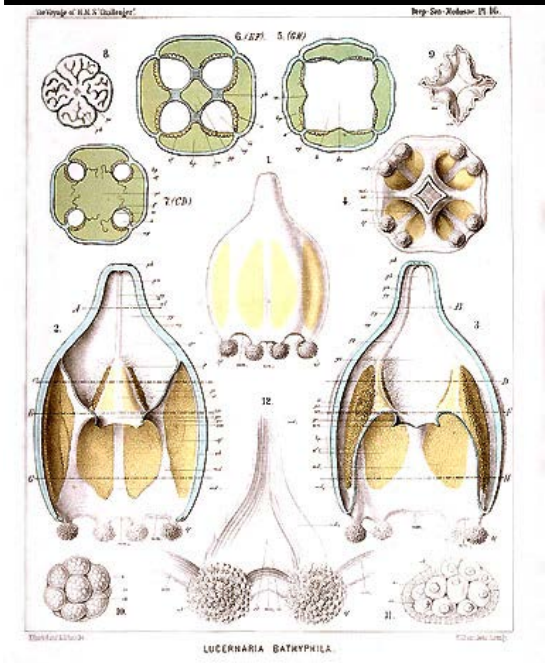
INITAL FACTS

- Invertabrate
- Over 95% water
- Trumpet shaped body
- Projecting tentacles
- Central stalk
- 8 Principle tentacles
- Apical elongation
- Benthic
- Considered “sessile” (static)

GENERAL ANATOMY

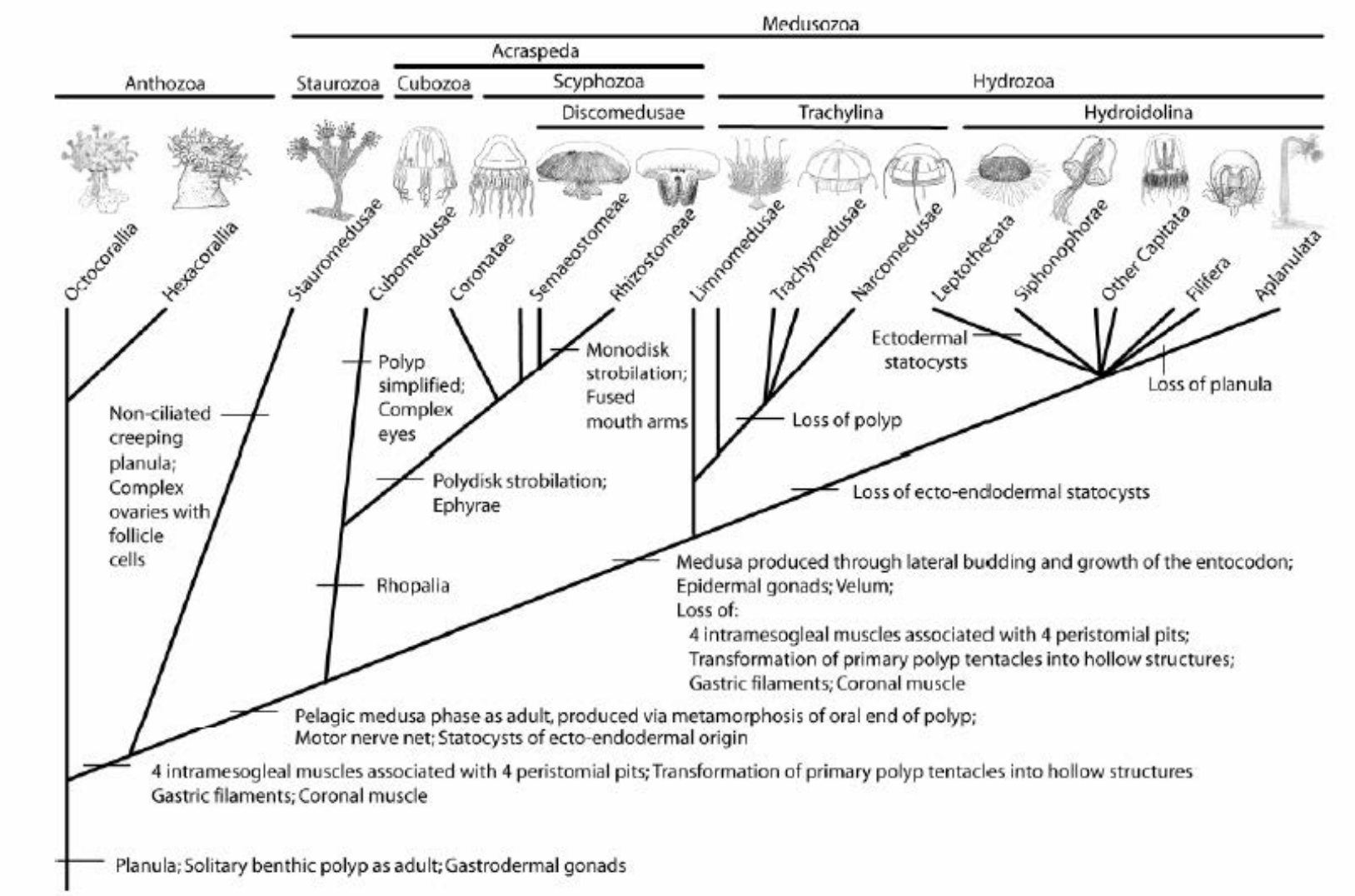
- Scientific Name: Lucernaria Janetae
  - Extremely large stalked jellyfish:
  - Each tentacle tipped with clusters of up to 100 secondary tentacles
  - Single chamber stalk. Some species have up to four chambers





Underlying Principles

CURRENT VIEW OF CNIDARIAN RELATIONSHIPS



Evolution

SCIENTIFIC CLASSIFICATION

Kingdom: Animalie Eumetazoa (Animal Metazoan)

Phylum: Cnidaria (Corals, Sea Anemones, Jellyfish)

Class: Staurozoa (Stalked Jellyfish)

THE DEBATE

Fusion of the Anemone and the Medusa

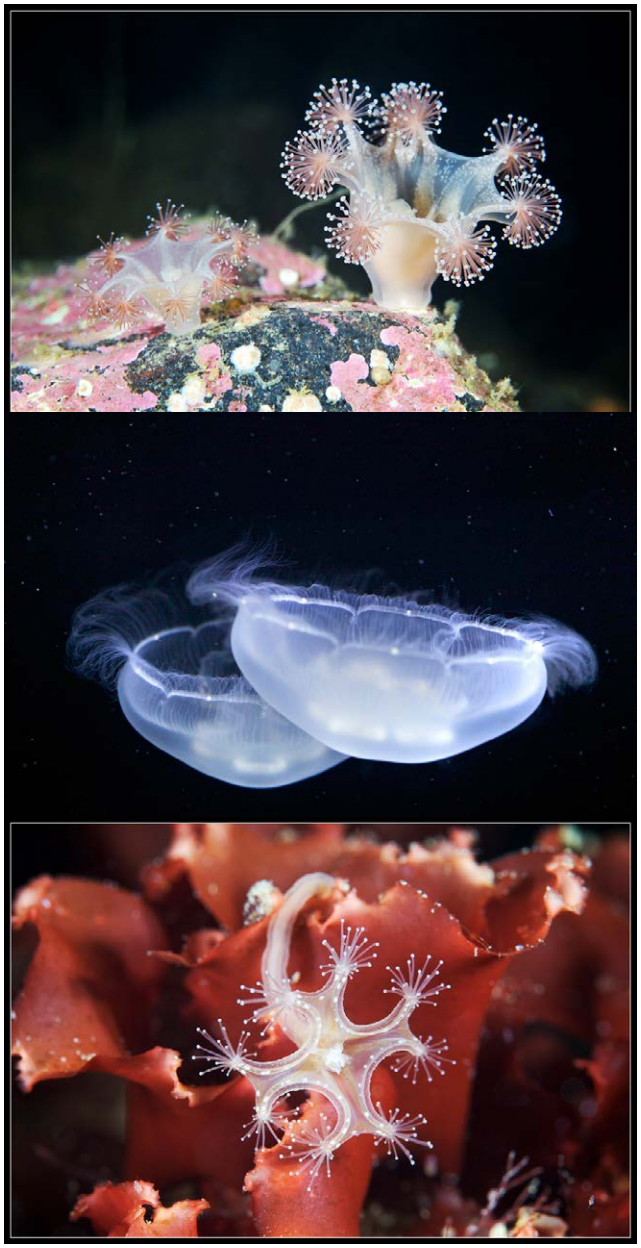
Signs Relating to the Anemone:
- Appearance
- Bottom dwelling characteristics

Signs Relating to the Medusa
- Does not have the same life cycle of a polyp
- 1847: first described medusa with an apical alongation
- Tentacle structure and predating method

CONCLUSION

Currently classified under the Scyphozoa evolutionary class
- Medusa during the warm summer months
- Bottom dwelling polyps during the colder months

Due to changing climates/environments. the stalked jellyfish came about as an adaptation to survive



Materials

- The stalked jellyfish's body is composed of a funnel-shaped calyx, or bell, and a stalk with a sticky basal disk at the end.

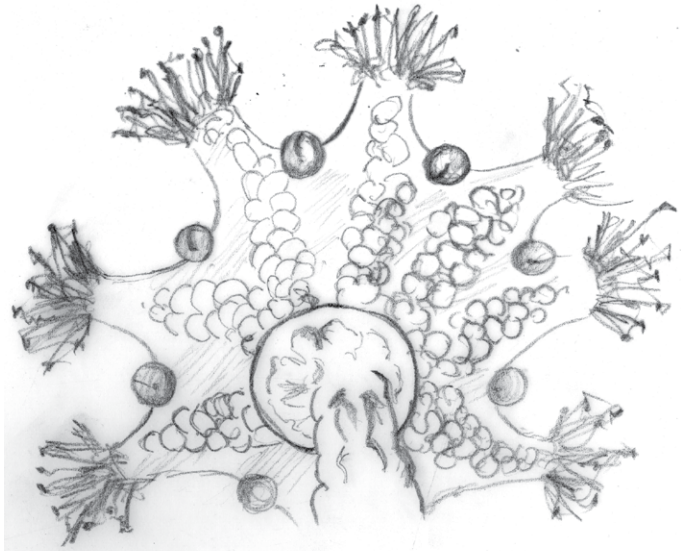
- They have eight webbed arms, each with about 50 tentacles on the end

- It is a sessile polyp that uses its sticky basal dic to attach itself

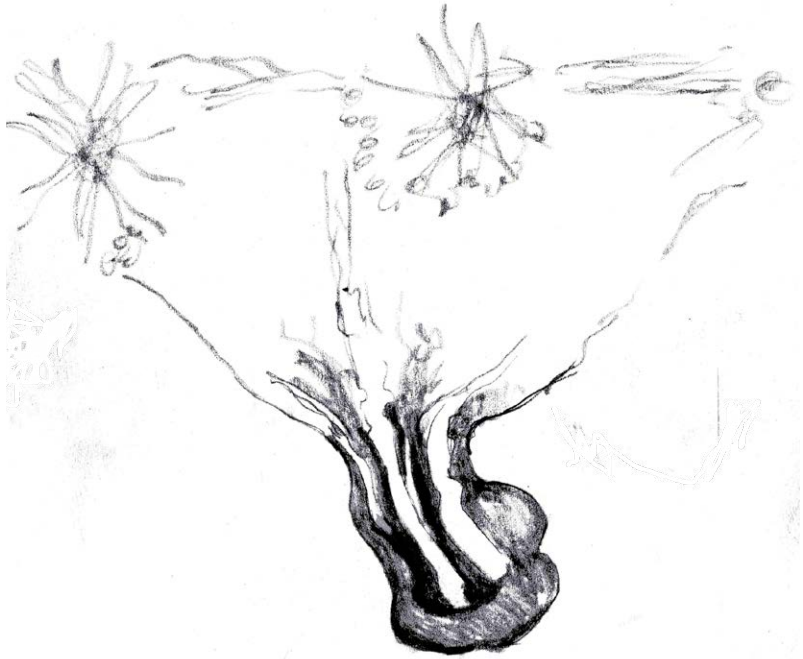
- Stalked jellyfish can stretch and contract their bodies to reach out and grab food while remaining attached to their substrate by contracting either the longitudinal muscles in their stalks or the circular muscles in their calyxes

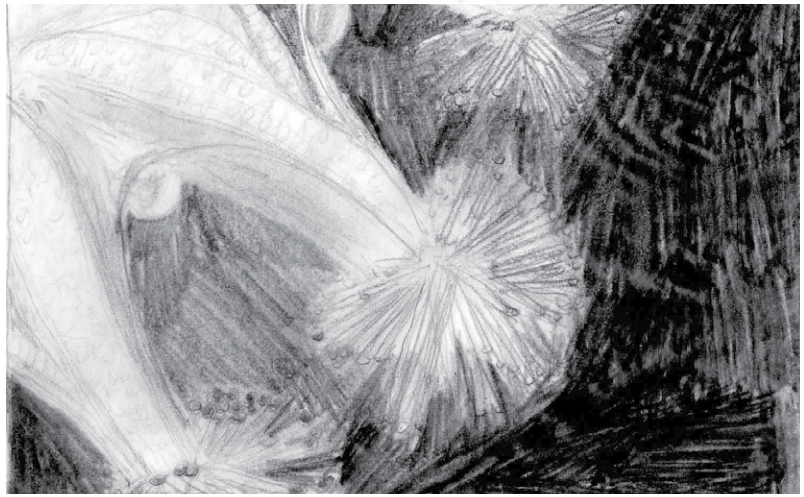
- The skin of the stalked jellyfish is thin enough to oxygenate by diffusion

- The jelly-like membrane is surrounded by two layers of protective skin. The top layer is called the epidermis, and the inner layer is referred to as gastrodermis, which lines the gut.



STALKED JELLYFISH: STALK TRANSPARENCY





Attachment to Substrate

-They can be found on most types of seaweeds and seagrasses, but prefer to attach to leaf-like fronds of kelp plants

- They also attach to stones and rock formations

- Ofter the color of the stalked jellyfish matches the color of its substrate. This is because the jellyfish is able to absorb the pigment of the substrate through the basal disc and gradually take on the substrate's color

Mechanical Properties

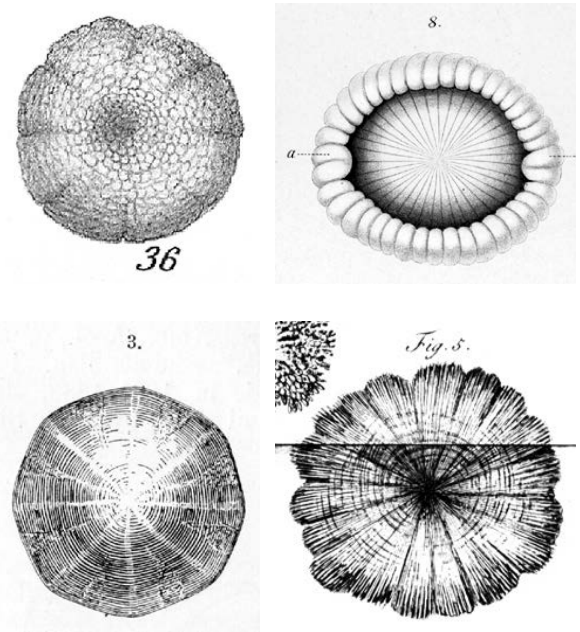
PEDAL DISK (BASAL DISC)

Structure:

Composed of a thin tissue plate and is used by the animal to adhere to and move across the surface

Adhere:

Bio-chemical glue: it releases some kind of bio-chemical fluid which is adhesive and helps the stalk attach itself to seaweed or rocks



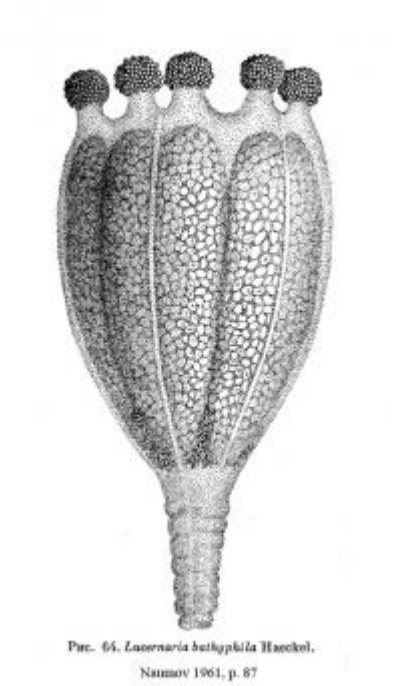
KNOBBED TENTACLE

Anchor:

Some parts near the tentacle metamorphosed into an adhesive organ serving as a sort of anchor

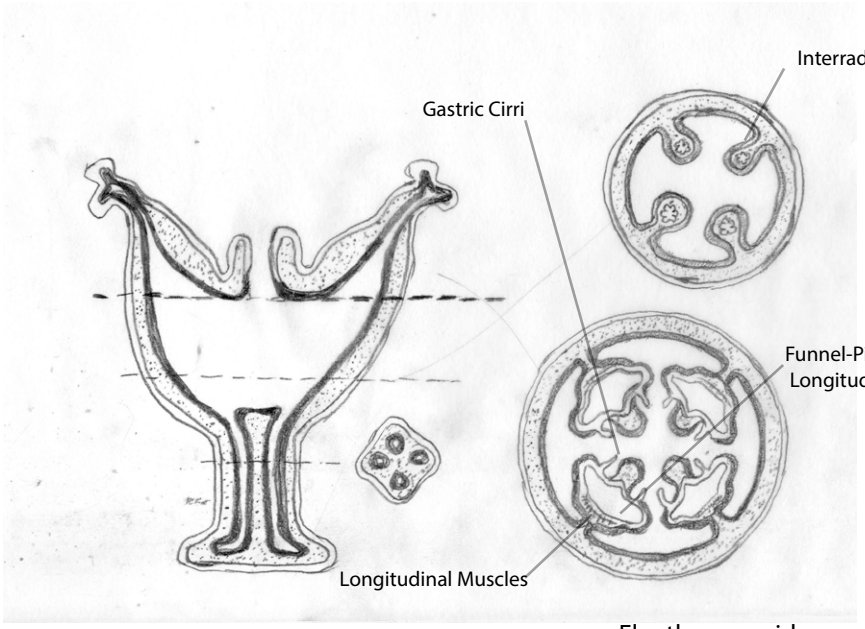
Cnidocysts:

the “stonging cells” that cnidarians use to capture prey

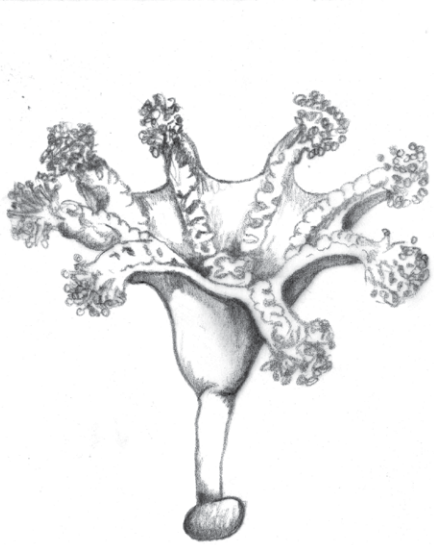


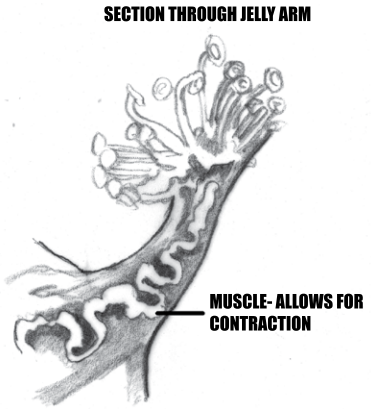
Pic. 66. *Lucernaria bathyphila* Haeckel.
Naumov 1961, p. 87

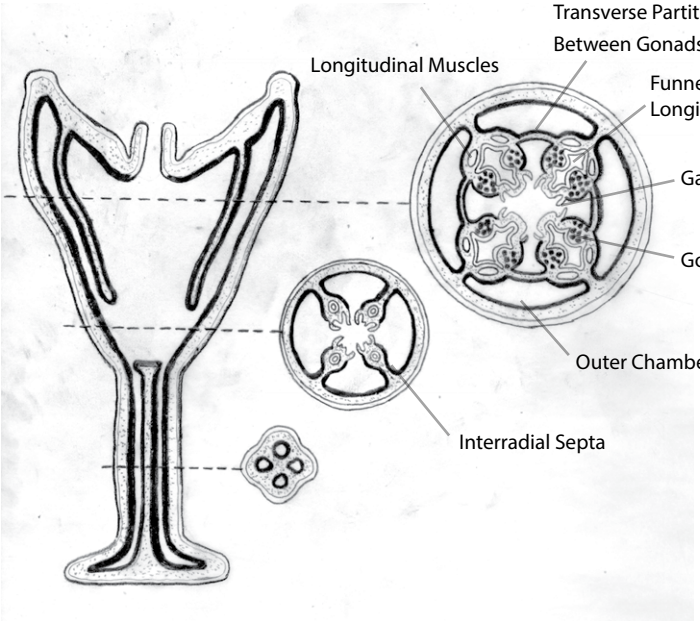
The Diagram of Anatomy Details



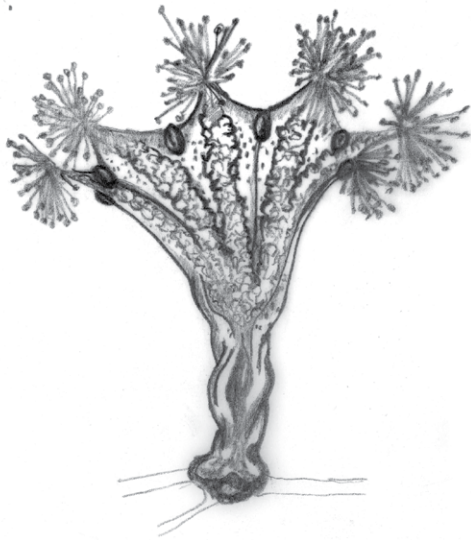
Eleutherocarpidae







Cleistocarpidae



Mechanical Properties

MOVEMENT AND MUSCLE

Movement:

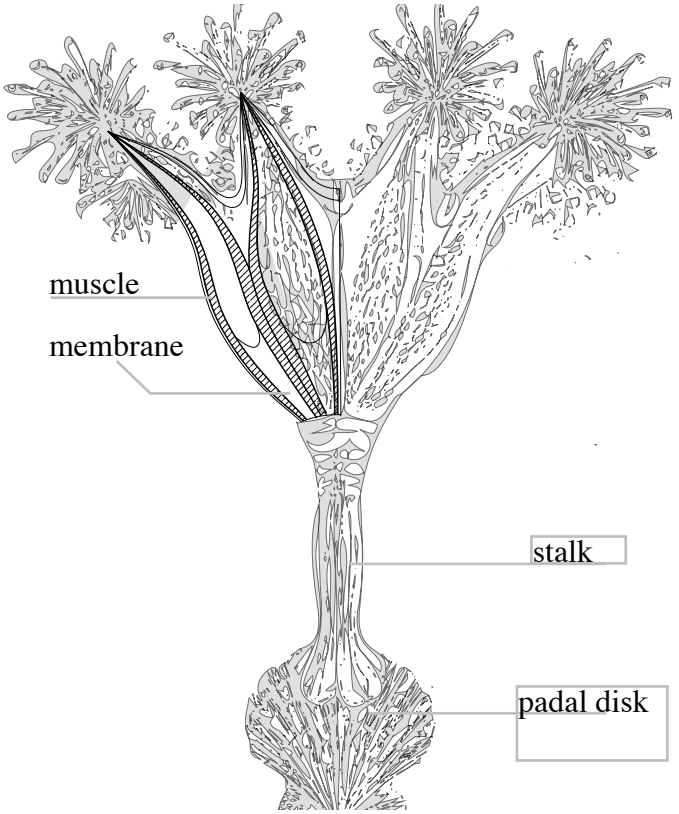
Except from moving its arms, it also sometimes moves temporarily to find a new location

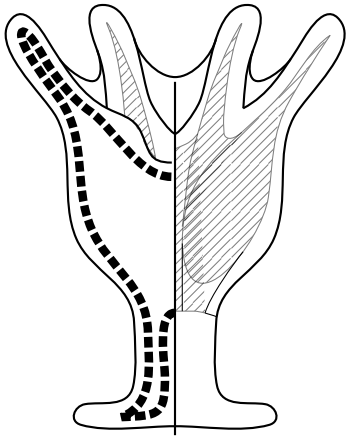
Actions:

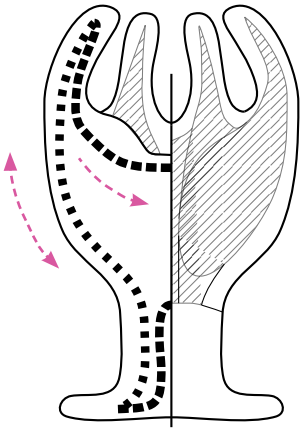
- Detachment from basal
- Bend at its stalk and torn over to use its knobbed tentacles as temporary feet
- Reattach to new location with its basal disc

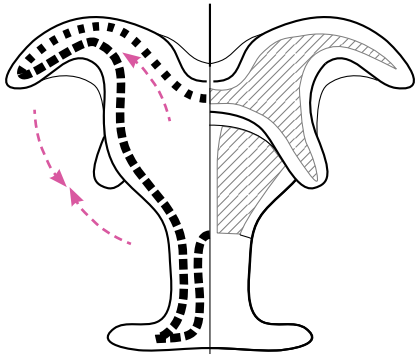
Ring & Longitudinal Muscle:

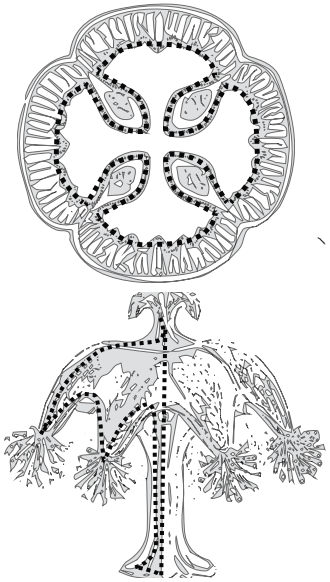
Four inter-radial longitudinal and radial ring muscles work together as a system to achieve some complex movements



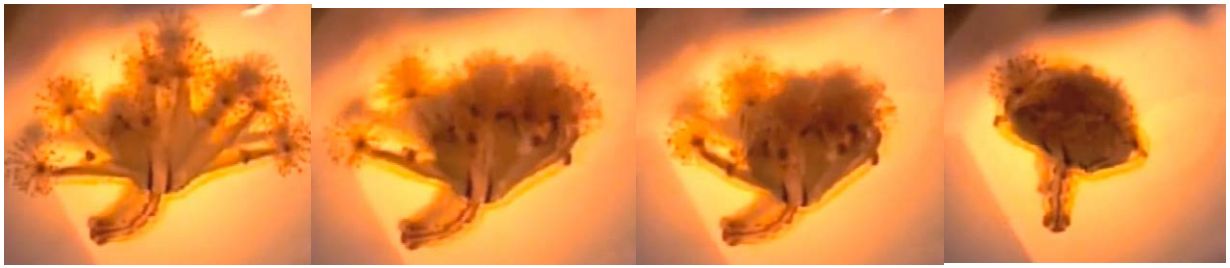


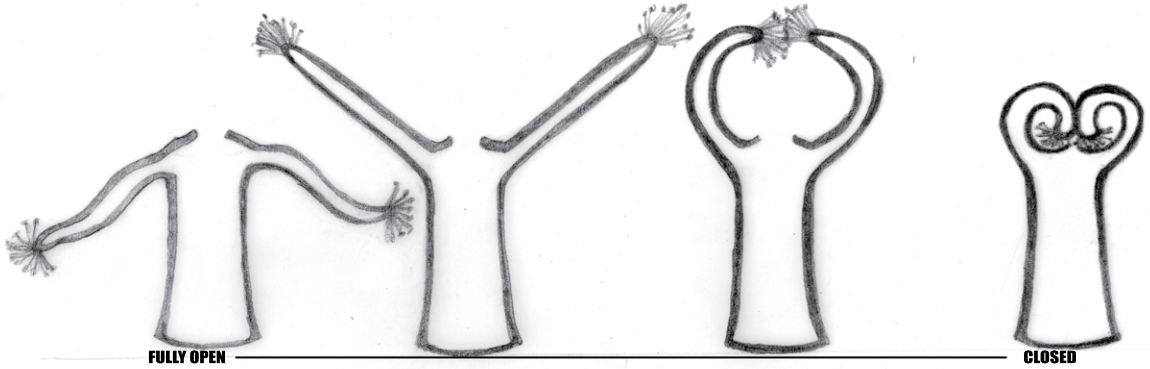


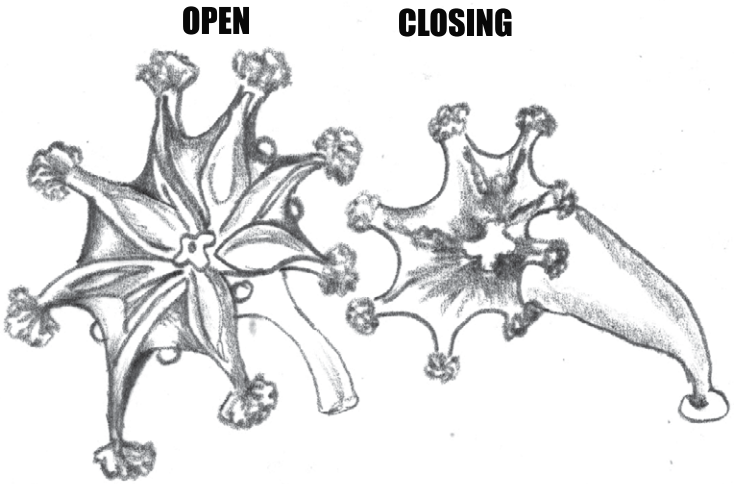


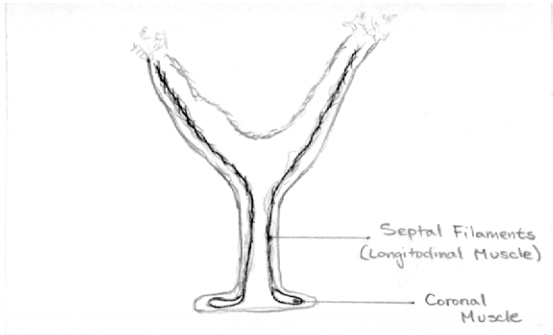


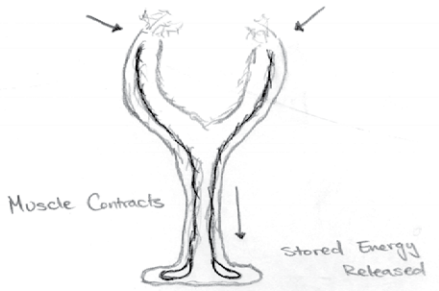
Time Lapse Drawing of Muscle Contraction

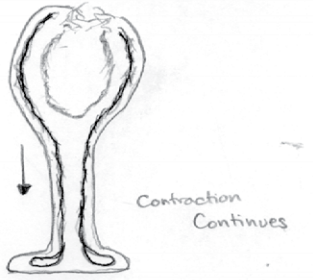


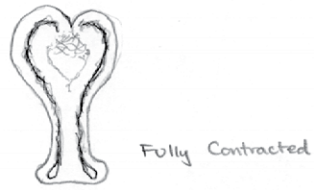




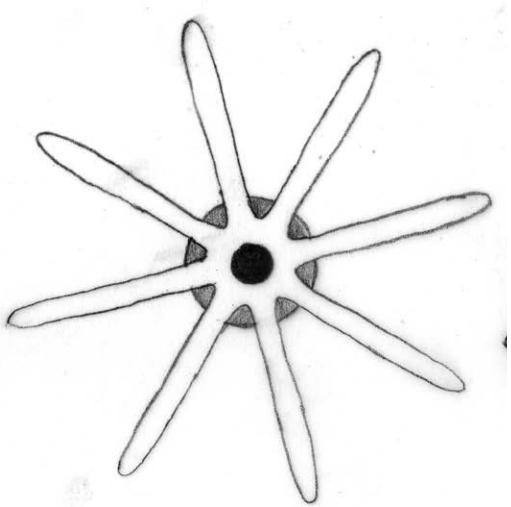




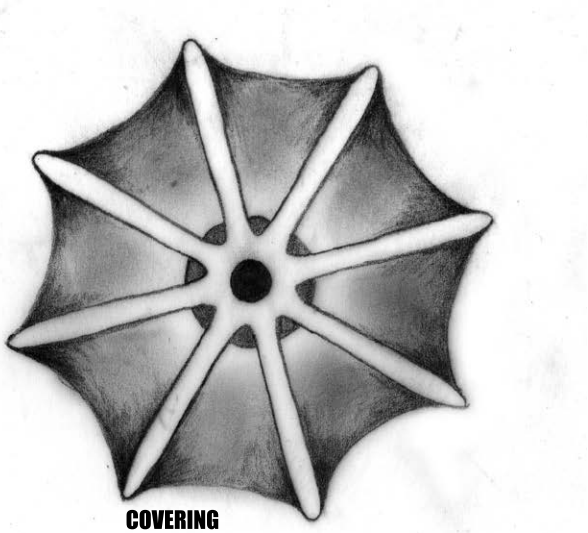




Analysis Drawings of Sections



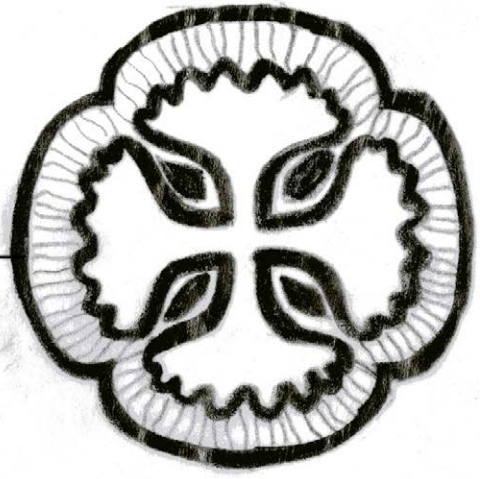
SUBSTRUCTURE
(MUSCLES)



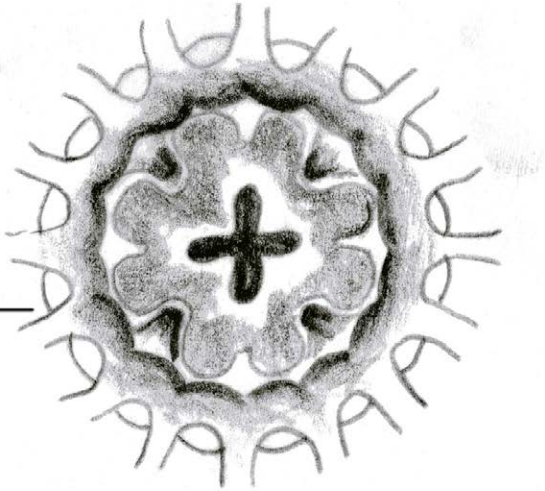
COVERING

Sections Through Stalk

Through The Center

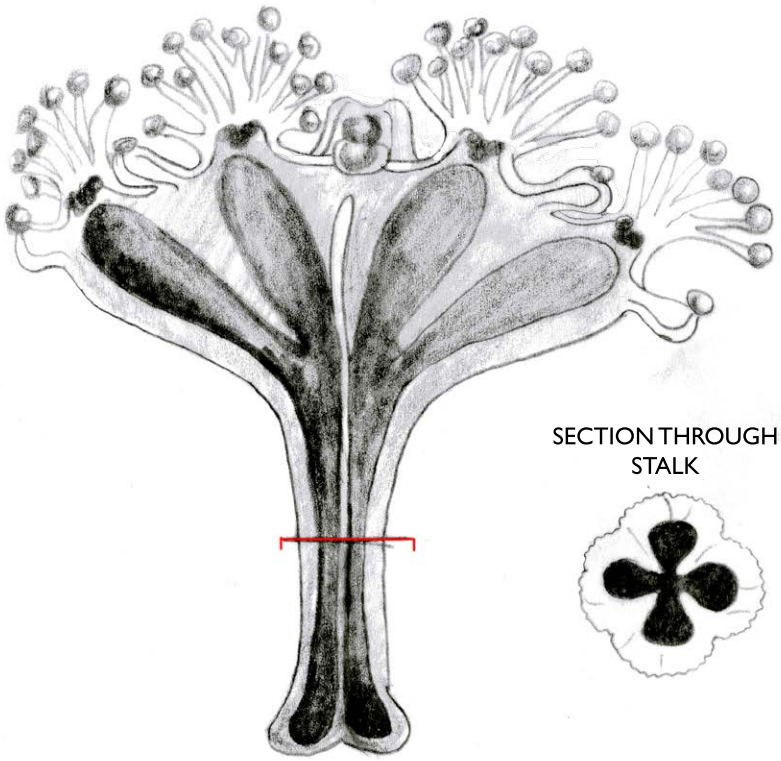


Close to mouth opening where calyx begins

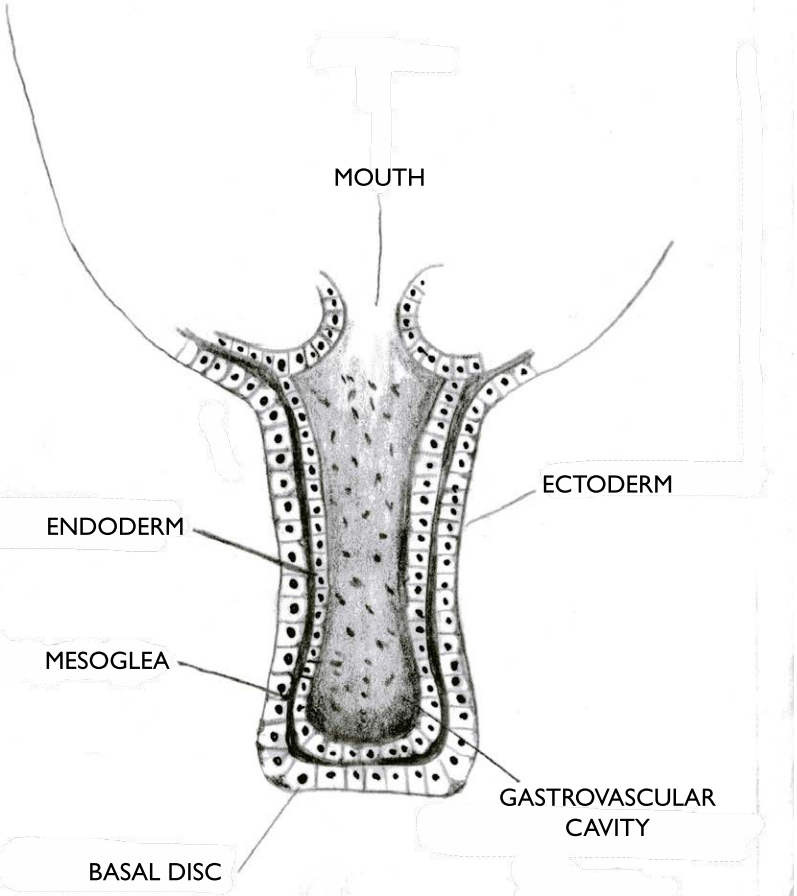


Analysis Drawings

These drawings show sections through the jellyfish highlighting the various layers of its stalk.



SECTION THROUGH STALK



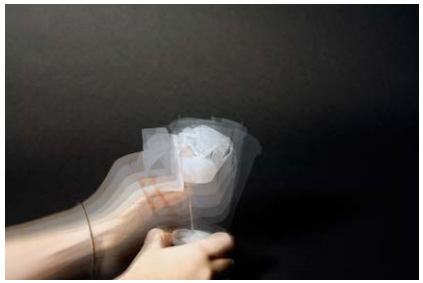
Bottle and coffee filter test

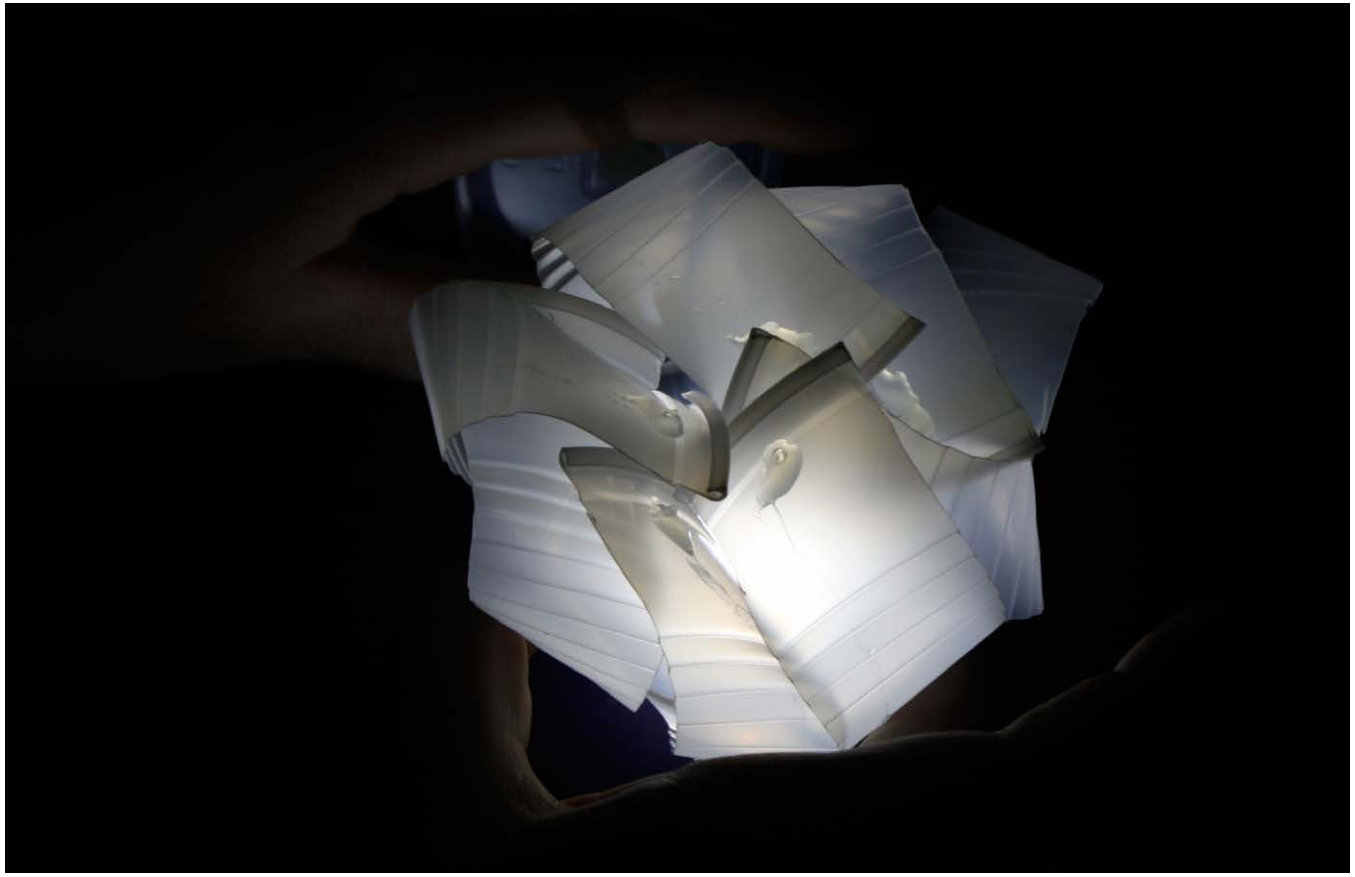






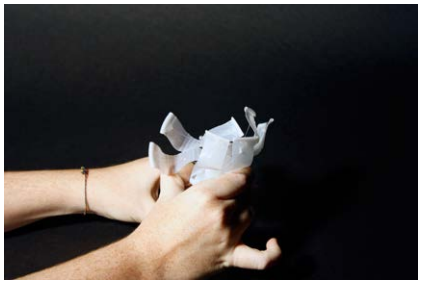
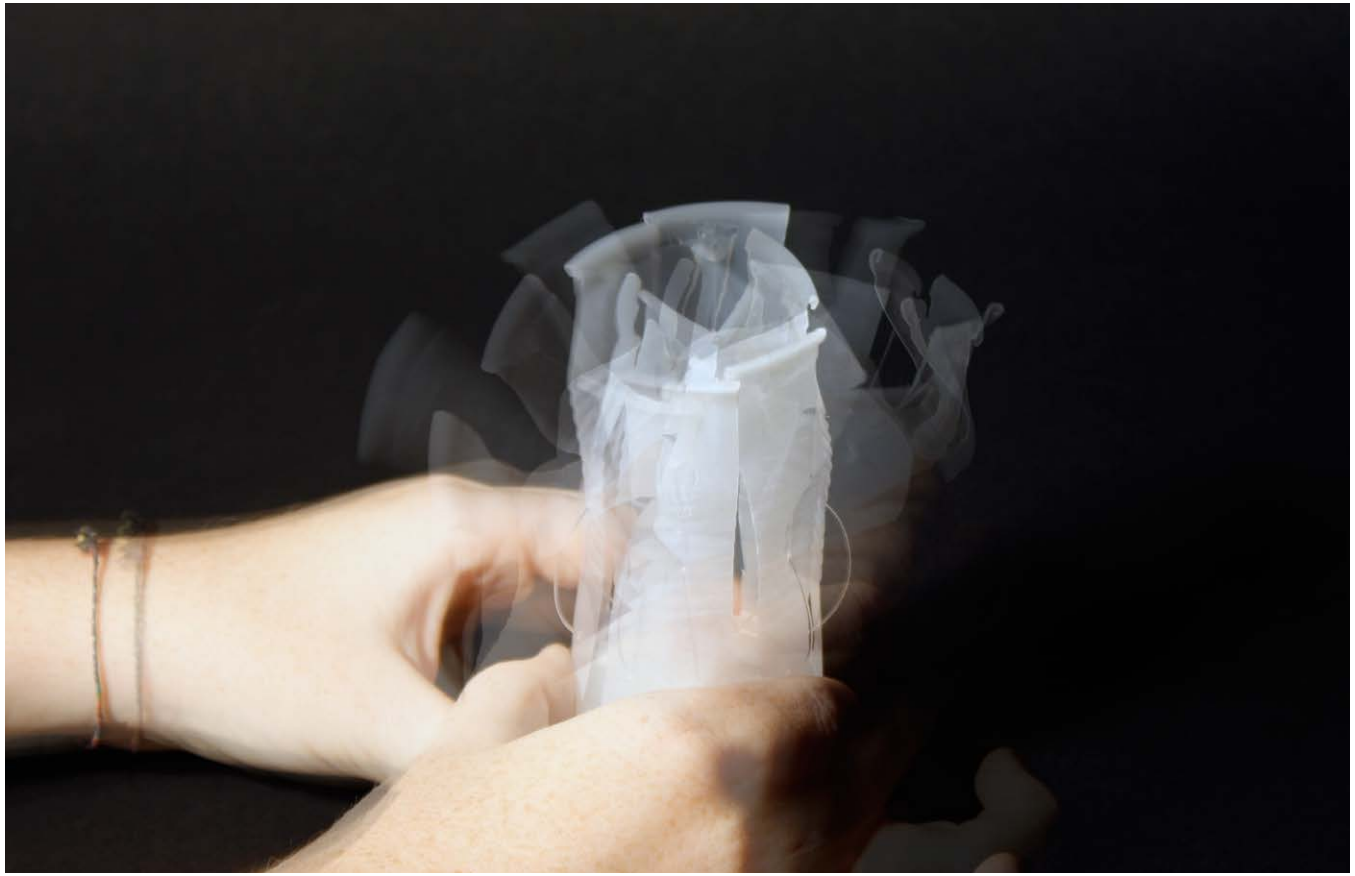

Cup and wire test I



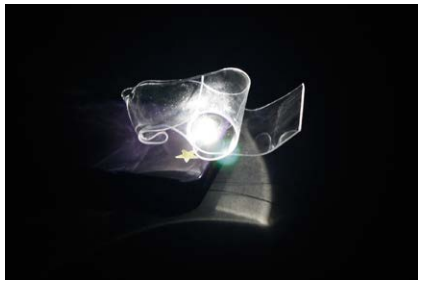


Cup and wire test II

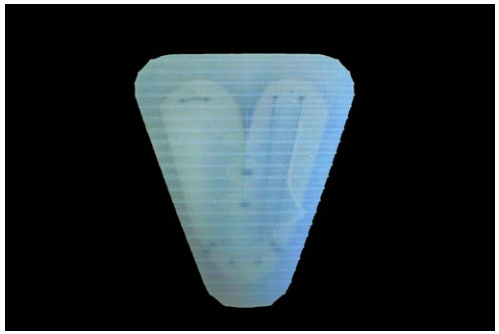
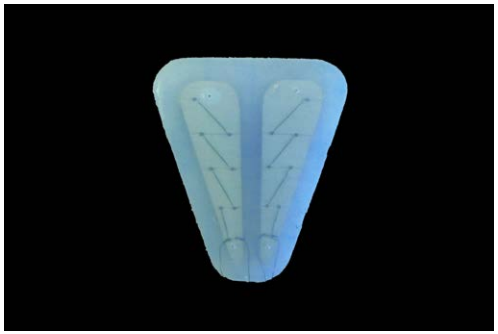
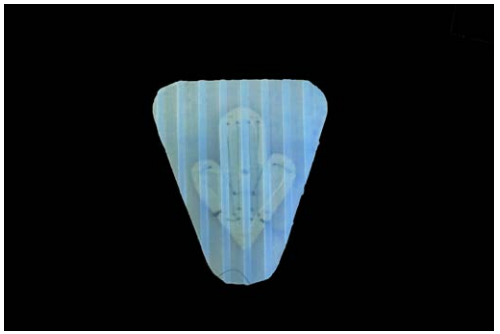
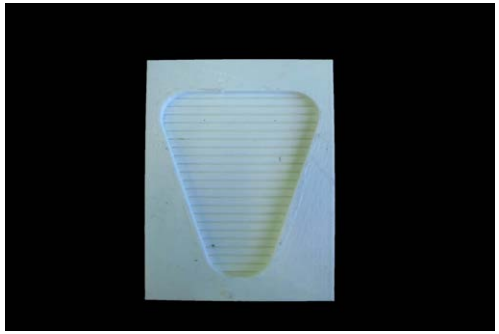
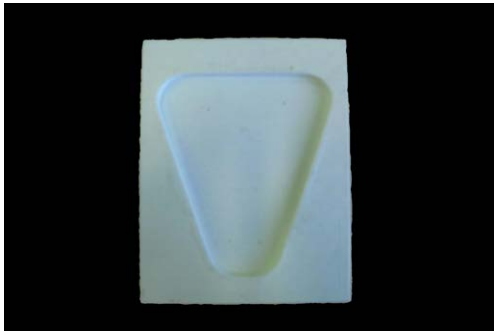
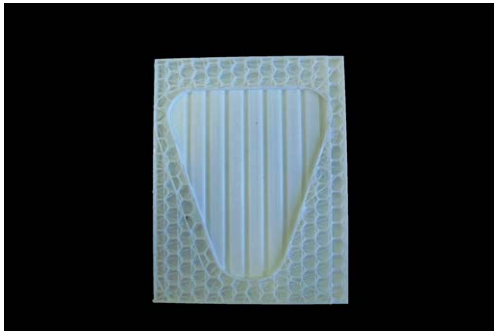
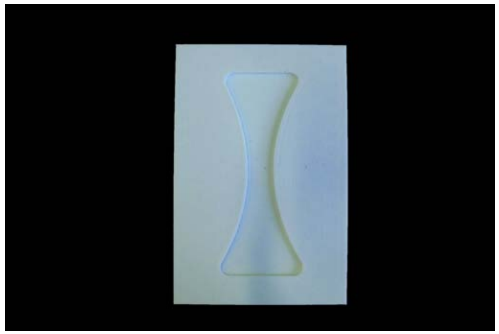



Heating plastic test

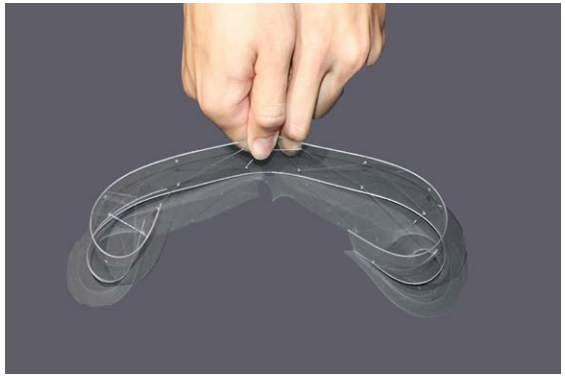


Silicone and wood tests with nitinol

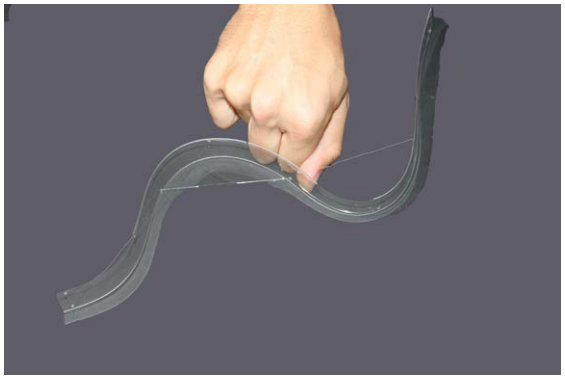








These tests explored the relationship between silicone and the nitinol twined wooden spines. These explorations tested the maleability of a silicone exclosed system and the full range of reactions along the whole surface of the silicone as the nitinol tightened. These explorations made us realize that very thin films/ membranes of silicone would be the better direction to go because the silicone enclosing the whole system only made it stiffer.

Plastic and wire test I



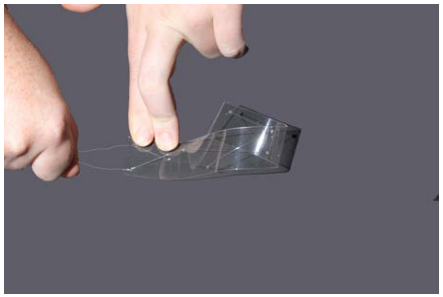
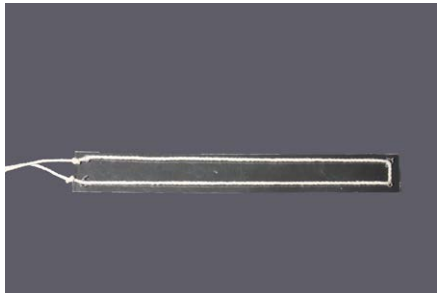
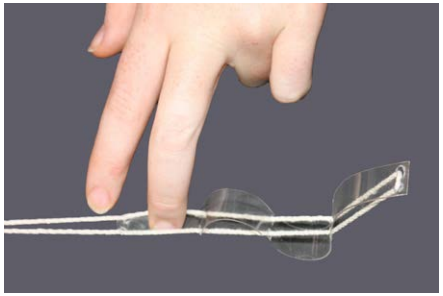


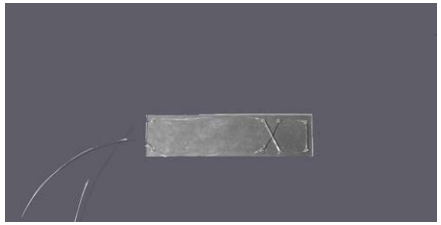
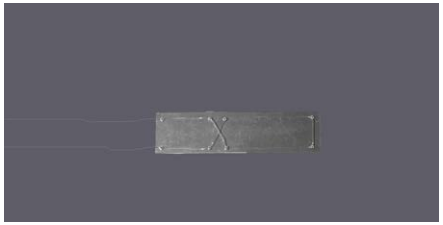
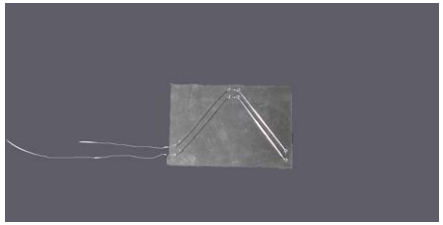
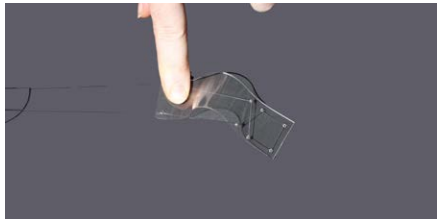
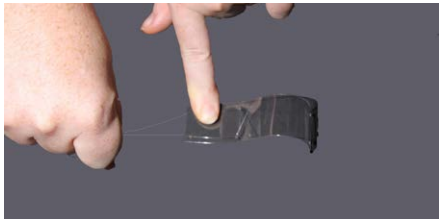



These sets of explorations further continued the controlled system of using different lengths, weaves, and widths to achieve different types of reactions when tightened. The success in this exploration came through the discovery of specific weaves that began to mimic the physical and mechanical nature of the stalked jellyfish.

Plastic and wire test II



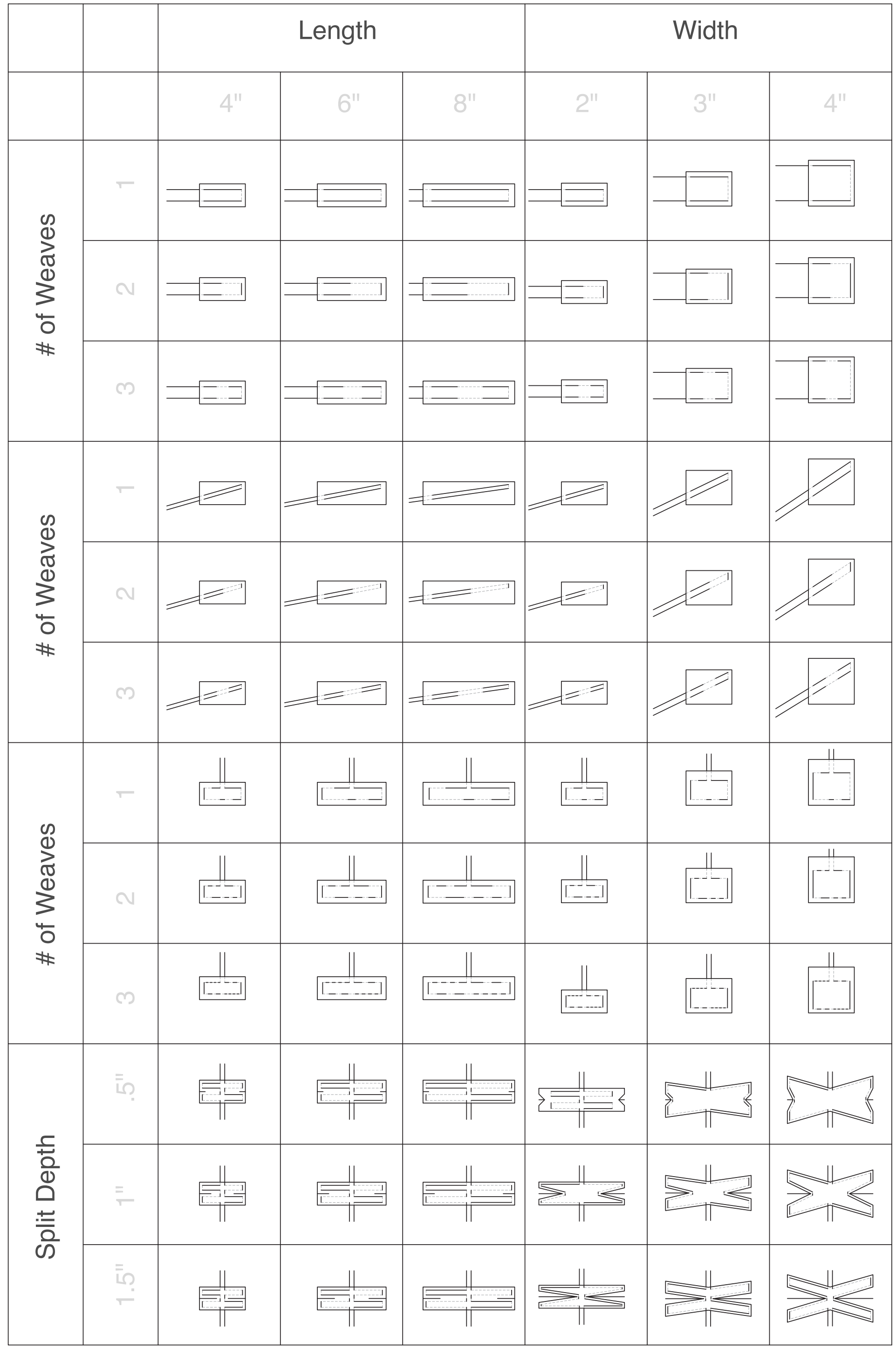

Continued controlled experiments that were derived from a simple matrix that began to touch up on all the basic parameters that we had to understand before delving into more complicated shapes, forms, weaves, and systems.

Matrix 1 I Straight

Matrix 2 I Angled

Matrix 3 I Zig-Zagged from Center

Matrix 4 I Split



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