Sometimes ‘moulage’, sometimes pure ingenuity, FX has a place in making our medical simulations more immersive, believable and valuable.

**Presenter:** Maeve Geary, BDes (Hons) Special Effects Development
- SimPeds Simulation FX Development & Research
- PhD Candidate ‘The evolving role of Special Effects as a component of Medical Simulation Engineering’

maeve.geary.fx@gmail.com
WHAT? Hollywood special effects techniques are used increasingly to improve fidelity in medical simulation. This workshop will focus on ‘Moulage’ – AKA Basic Special Effects Makeup*

WHY? It has become apparent that greater visual and haptic realism improves simulation training.

WHO? Anyone can try and experiment with the techniques covered in this workshop. Simulation technicians may find this most informative and applicable.

WHERE? These techniques can be applied in any scenario; in hospital or off site. Pre-prepared ‘transfers’ can speed up preparation and application.

👍 BURNS
👍 BRUISES
👍 GELATIN FLESH
👍 GELATINE TRANSFERS
👍 SUGGEST FURTHER READING
Image references: An understanding of bruise coloration relative to severity and age

Materials: Low cost, readily available

Technique: Human or mannequin
Researching your desired effect is very important. Unlike with film & television, where visual impact and artistic vision are paramount, Medicine requires realism and fidelity. The following is taken from the websites linked below.

- **Red Bruises**
  When you first get a bruise — especially one near the surface of your skin — it usually appears red. The color comes from fresh blood leaking into your tissues. Fresh blood is bright red because it contains both iron and oxygen.

- **Blue Bruises**
  Within a few hours, blood that has leaked from your injured blood vessels loses the oxygen it was carrying. As this occurs, the blood becomes darker and your bruise begins to look more bluish or purple. Note that if you have a deep bruise, the red stage may have already passed by the time you are first able to see the bruise. So the first color you see may be a bluish purple color.

- **Purple Bruises**
  Typically, over one to three days (depending in the severity of your injury), a bruise becomes more intensely purple and may even appear black. This occurs as red blood cells break down and iron is released into the injured area.

- **Green Bruises**
  You’ll know your bruise is beginning to go away when you notice it turning green. You’re likely to first notice the transition from purple to green at the edges or center of a bruise. The green color is due to the presence of a hemoglobin breakdown product called biliverdin. The last part of the word, “verdin,” comes from the Latin word for green — making it easy to remember (and impress your friends).

- **Yellow Bruises**
  At long last, your green bruise will eventually turn yellow as it enters the final stage of healing. The yellow color is from the final breakdown product of hemoglobin in your skin, a chemical called bilirubin. The yellow fades as your body clears away the last of the debris from the bleed, leaving you with bruise-free skin that is none the worse for the wear.

- **References**

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**Materials Needed:**
- Make-up Color palettes
- Water
- IPA (alcohol)
When red blood cells break down, they release an iron-containing protein called hemoglobin. As your bruise begins to heal, your body converts the hemoglobin into other colored chemicals. You’ll typically see a new bruise progress from **red to blue to purple** within the first couple of days after an injury.

**Most are multicolored.** This is because the amount of blood in different areas of the bruise varies, and the stages of healing overlap.

![Bruise Progression Diagram](image-url)

**Materials Needed:**
- Make-up Color palettes

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**Experiment!**
- Think about how to apply the color…
  - Which tools? A brush or sponge?
  - Stipple, flick, dab?
  - How many layers of color?

[Experiment Link](https://www.completewellnessreport.com/bruises-the-secret-behind-the-rainbow-of-colors/)

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(Boston Children's Hospital)
• Image references: Degrees of burns and how they present visually
• Materials: Low-cost, readily available
• Techniques: Human or Mannequin
<table>
<thead>
<tr>
<th>Burn</th>
<th>Damage</th>
<th>Appearance</th>
<th>Texture</th>
<th>Sensation</th>
<th>Treatment</th>
<th>Complications</th>
<th>Looks Like</th>
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<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Affects only the outer layer of skin - burned, but not all the way through.</td>
<td>Redness, swelling (no blisters)</td>
<td>Dry</td>
<td>Painful</td>
<td>Cool with running water or a cold compress.</td>
<td>Repeated sunburns can lead to cancer.</td>
<td><img src="http://www.burninjuryanswers.com/treatment/" alt="Image" /></td>
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<td>degree</td>
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<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Affects first and second layers of skin - 1st burned through and 2&lt;sup&gt;nd&lt;/sup&gt; also burned</td>
<td>Intense and splotchy redness, wet blisters</td>
<td>Moist</td>
<td>Painful</td>
<td>Cool with running water or cold compress, cover with loose, sterile gauze.</td>
<td>Local infection, cellulitis</td>
<td><img src="http://www.burninjuryanswers.com/treatment/" alt="Image" /></td>
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<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Affects first and second layers of skin - both burned all the way through.</td>
<td>Red and white, bloody blisters</td>
<td>Moist</td>
<td>Extremely painful</td>
<td>Immediate medical attention</td>
<td>Scarring, possible skin grafting</td>
<td><img src="http://www.burninjuryanswers.com/treatment/" alt="Image" /></td>
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<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Extends through all layers of skin.</td>
<td>White and brown</td>
<td>Stiff, dry, leathery</td>
<td>painless</td>
<td>Immediate medical attention</td>
<td>Scarring, contractures, possible amputation</td>
<td><img src="http://www.burninjuryanswers.com/treatment/" alt="Image" /></td>
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<td></td>
<td>Extends through all layers of skin, sub-dermal tissue, and into muscle and bone.</td>
<td>Black, charred, with dead tissue.</td>
<td>Dry</td>
<td>Painless</td>
<td>Immediate medical attention</td>
<td>Amputation, functional impairment, gangrene, death</td>
<td><img src="http://www.burninjuryanswers.com/treatment/" alt="Image" /></td>
</tr>
</tbody>
</table>
- **Technique**
  - Just as with the bruises we must concentrate on checking references, choosing our colors and materials wisely.
  - With burns we can experiment with more materials. Simple and readily available materials such as PVA glue, charcoal powder and KY jelly can really add to the realism.

- **Experiment!**

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**Materials Needed:**
- Makeup colour palettes.
- Brushes and sponges
- KY Jelly
- Charcoal powder
- PVA Glue (Elmers Glue)
• Materials: Drug store Recipe
• Technique: Can be applied directly to skin or mannequin (careful of temperature!)
• Batches can be stored for future applications
Recipe

- 1 part powdered gelatin
- 1 part hot water
- ¼ part glycerin
- ¼ part sorbitol

(Adding sorbitol increases the tensile strength of the gelatin; meaning, it makes the gelatin more tear-resistant. Powdered Zinc Oxide may also be added to the gelatin recipe to increase tensile strength.

Technique

- Put all the above ingredients in a heat-proof container. Put the hot water in last and mix vigorously so as to avoid lumps of un melted gelatine.
- Once mixed, add your pigment. Most store bought mae-up foundation will work. Only use a little at a time; it’s easier to add more than remove.
- Be VERY CAREFUL of the temperature before applying to skin, test a little on the inside of your wrist or arm.

References:

http://phantomonabudget.bravehost.com/gelatin.html

- This is just one example of an online reference, it’s always worth searching for alternatives. You may pick up some new tricks.

Materials:

- Powdered gelatin
- Water
- Glycerin
- Microwave
- Mixing & storage containers
- Sorbitol
- Pigment (i.e. makeup foundation)
- Experimentation!
• Materials: Same Drug store Recipe
• Technique: Pre-prepared transfers and Sculpting & moulding process & Application to human or mannequin
The gelatin ‘flesh’ can be used to cast transferable prosthetic appliances which can be pre-prepared and applied quickly

**Technique**

- Find a flat surface. A glass cutting board or tile for instance.
- Sculpt a wound or pathology onto the surface being careful to blend the edges down very smoothly.
- Once sculpted, then place a line of clay surrounding the pathology but not touching any edges.
- Place a cut container around the sculpture, making sure to bond the edges with a glue gun or more clay
- Mix up plaster or other molding material and pour. (A release agent can be spray or painted on to the sculpture to aid in the removal once plaster is cured.)
- Now, melt the gelatin and pour into the mold.
- Very quickly run a flat edged tool over the surface of the mold to force the gelatin into all crevices and to keep the blending edges fine.
- Place in fridge or freezer briefly to aid in solidifying the appliance.
- De-mold very carefully, attempt to keep the circle of gelatin attached to the appliance; it helps with placing the piece and prevents thing edges from curling
**Application**

- Choose placement for the appliance
- Apply adhesive thinly onto the prosthetic and allow to become tacky.
- Apply to the surface taking care to prevent thin edges from curling.
- Blend edges with witch hazel.
- Any stubborn edges can be blended additively with a thickened or creamed adhesive. (add powder to liquid adhesive)
- Color! Be mindful of the base of the pigments you use; (water-based or IPA soluable). Also, research painting techniques and experiment to make the most of your painting and finishing.

**Materials:**

- Flat surface
- Clay
- Plaster
- Vaseline/release spray
- Containers & mixing tools
- Gelatin flesh
- Witch Hazel/ IPA
- Prosthetic Adhesive
• Fake Blood
• Life Casting
• Person specific prosthetic appliances
- Make your own Fake Blood!
- Use glycerine, syrup, food colouring, coffee granules and experiment!
- Does it need to be edible? Non-staining? Arterial or venous?

Look up lifecasting. Check the references on the next page.

The materials for a basic lifecast are listed on the right, although many materials can be substituted for more expensive, long lasting molds and casts.

- Using virtually the same technique as when making the flat transfer appliance you can produce appliances contoured to the body of your model. This is especially useful for larger pieces.

Materials:
- Alginate (or other skin safe life casting material i.e. body double silicone)
- Plaster
- Plaster bandages
- Vaseline
- Containers & mixing tools
There are various books, websites and online forums which can help inform choices for 'moulage' and allow novices to gain advice from professional practitioners. Here are just a few examples of where to learn more!

- **Books:** i.e., Todd Debrecini's 'Special Makeup Effects for Stage and Screen'

- **Online:** Stan Winston School: A great online resource. Membership is required but there are numerous tutorials from the world's best FX artists.

- **Replica Prop Forum:** Hobbyists and professionals share their creative journeys and artefacts with one another.

- **Facebook Groups:** i.e. Neill Gorton's 911 Page

- **References:** Google! Simple, just get you search terms correct and double check your reference images are accurate to the intended pathology.

- **Be wary** of YouTube tutorials, within the FX community 'youtubers' are notoriously bad at having filtering processes to take into account health & safety and correct material choices or techniques.

- **Discuss:** with your MDs and Educators

- **Experiment & Enjoy!**