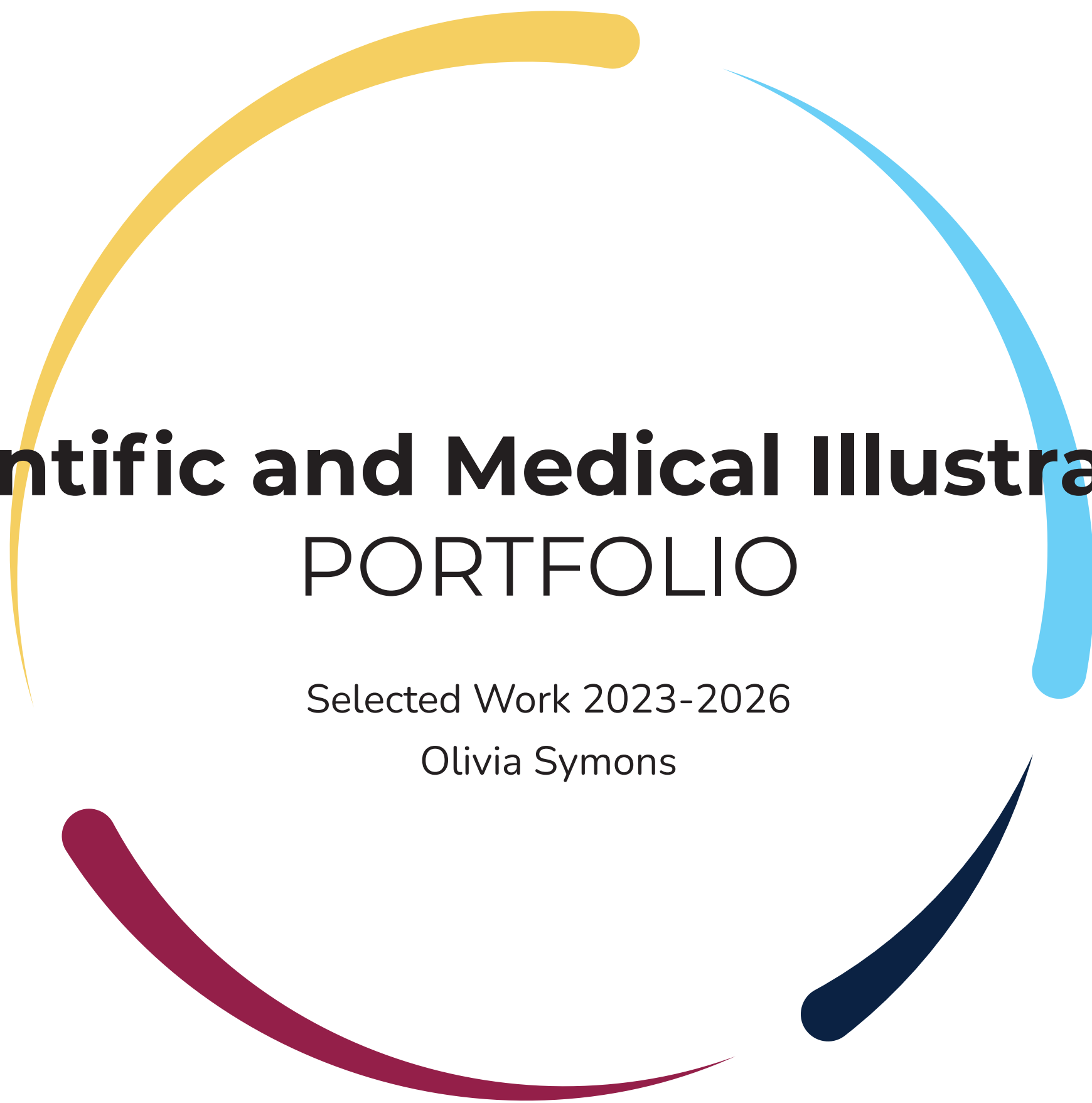
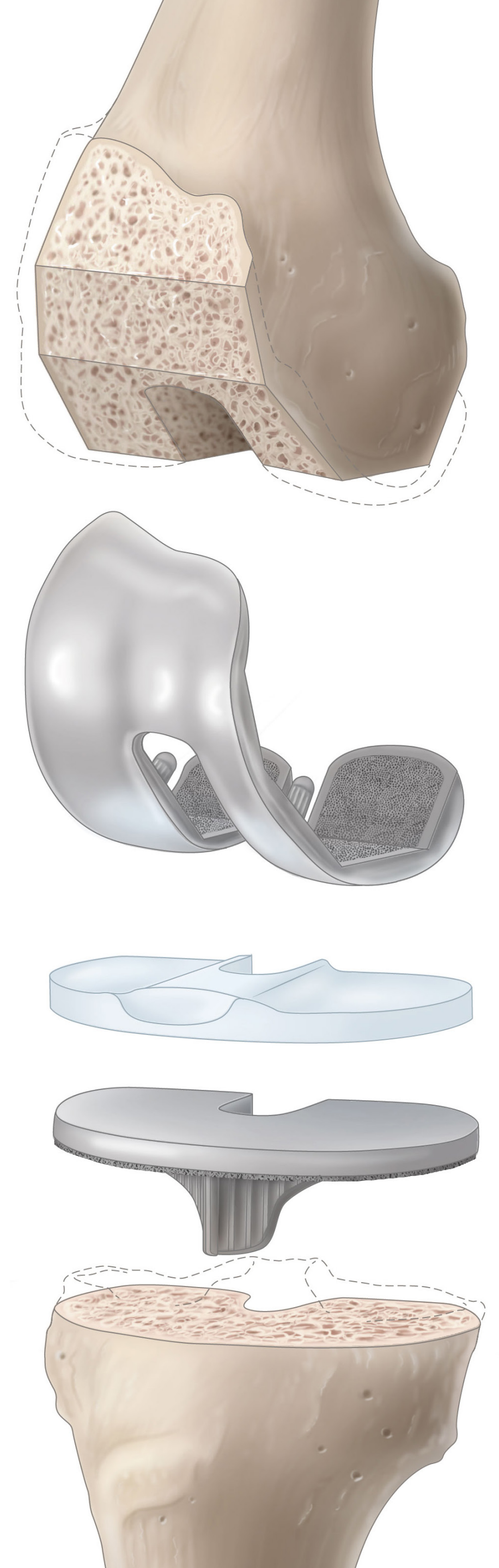




Scientific and Medical Illustration PORTFOLIO

Selected Work 2023-2026
Olivia Symons

osymonsillustration.com
oliviafsymons@gmail.com



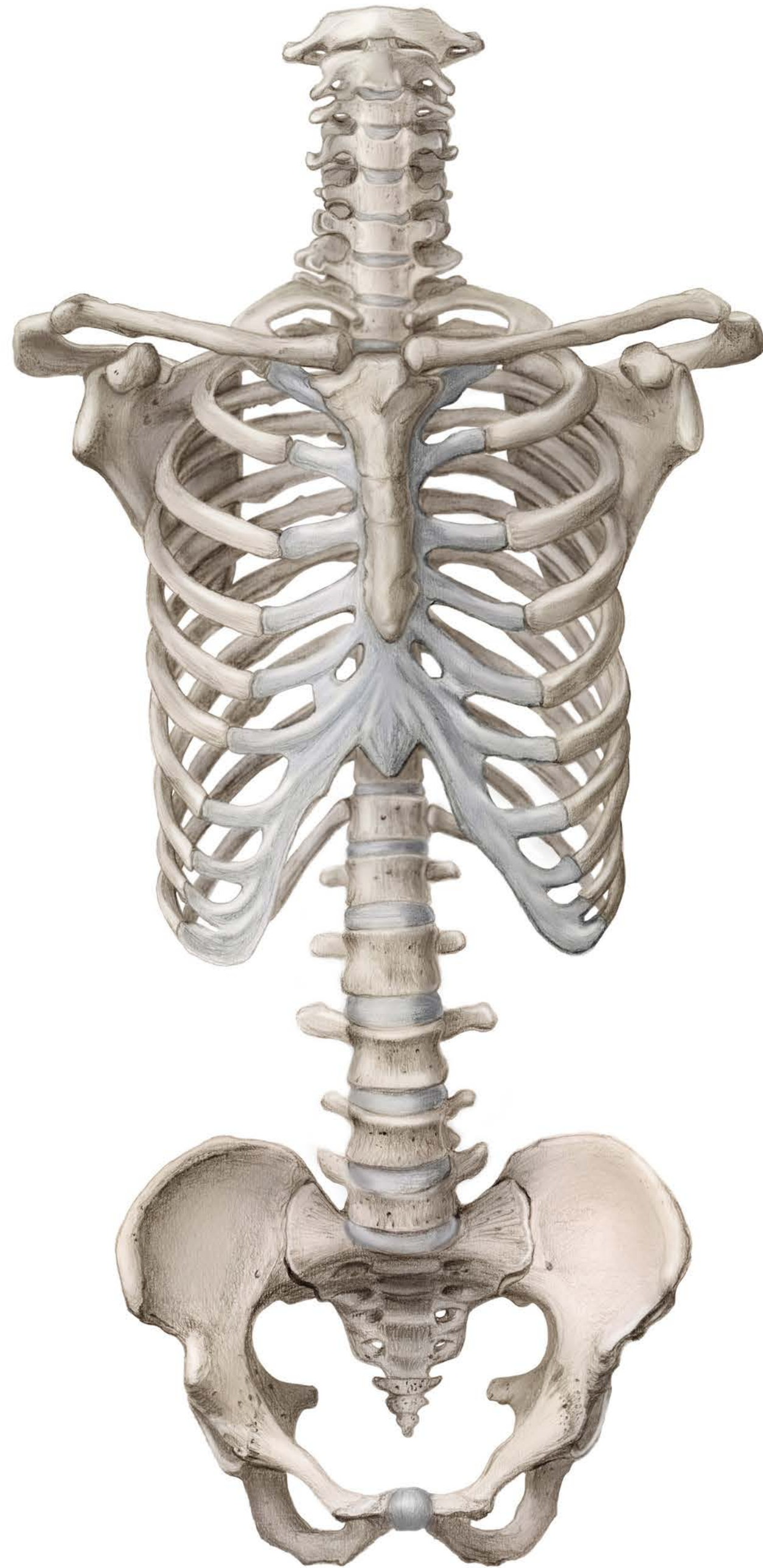


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- 10 The Rat Digestive System

Case 1

VISUALIZING A MEDTECH COMPLIANCE ECOSYSTEM

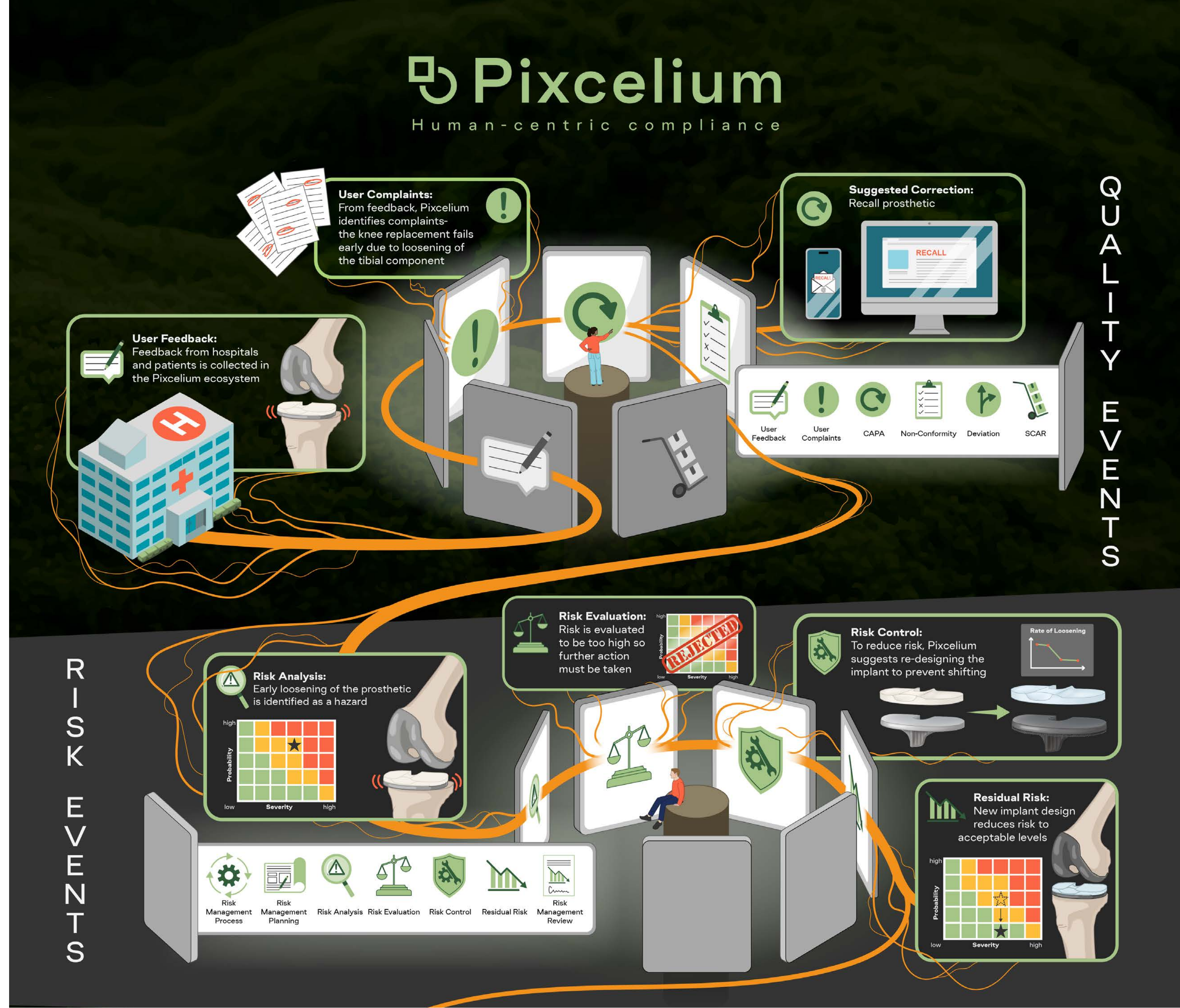
CONTEXT: Startup developing a software ecosystem to support MedTech regulatory compliance.

COMMUNICATION NEED: Explaining a complex regulatory system that involves multiple actors, regulatory frameworks, and data moving across the platform.

AUDIENCE: Investors, regulatory teams, future clients.

VISUAL SOLUTION: System level illustration of the compliance ecosystem that depicts regulatory processes at the quality events level

OUTCOME: Investors quickly understand the product, clients grasp the workflow and value proposition, teams can use the visual as a shared model of the system.



Case 2

EXPLAINING BIOMECHANICS FOR A SMART INSOLE TECHNOLOGY

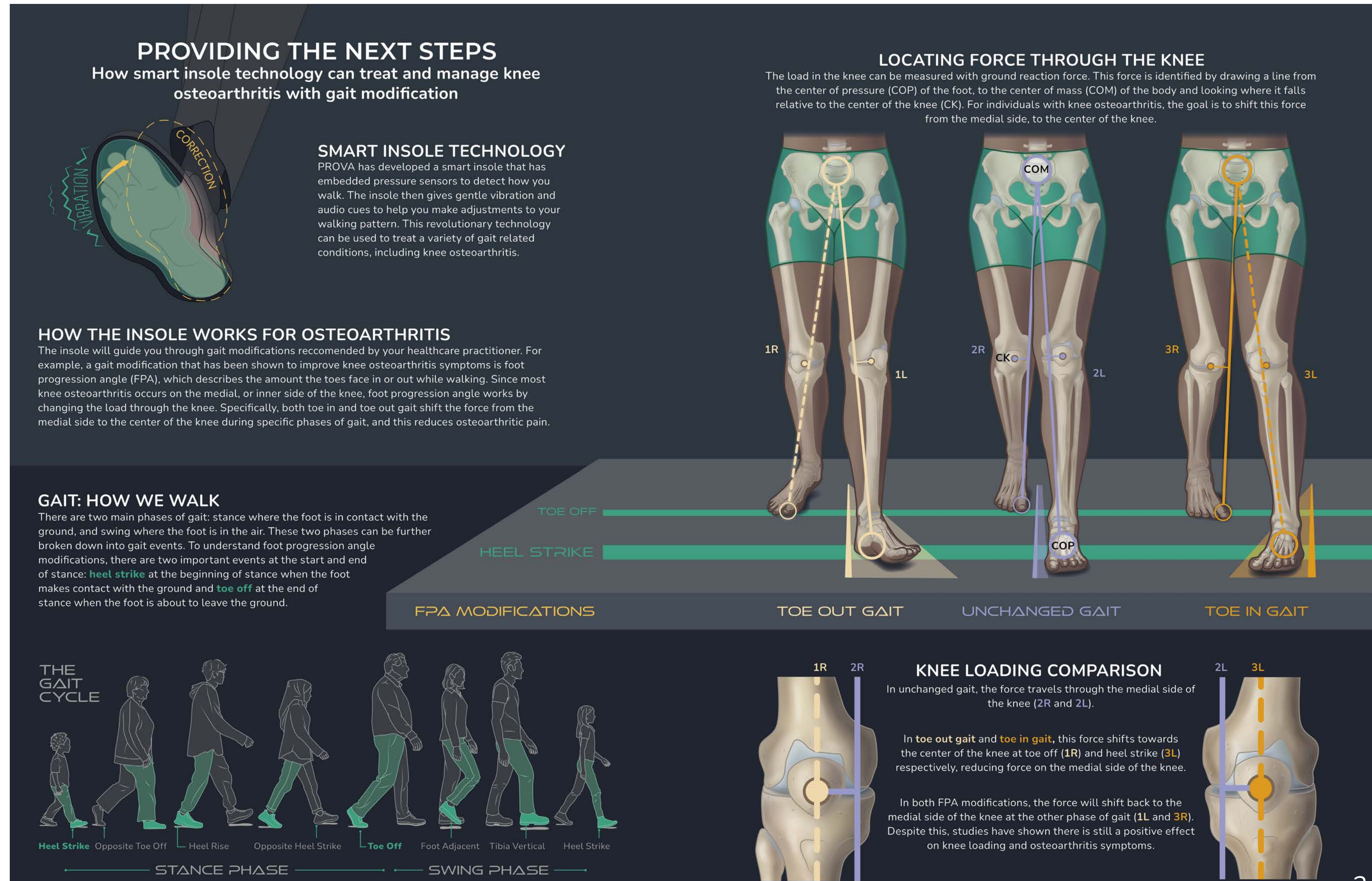
CONTEXT: Startup developing a smart insole to make gait modifications, targeting individuals with knee osteoarthritis to reduce knee loading

COMMUNICATION NEED: Technology relies on a biomechanical concept: changing foot angle during walking alters force distribution within the knee joint. Most audiences lack biomechanical expertise and the benefit may not be immediately obvious.

AUDIENCE: Investors, clinicians, patients.

VISUAL SOLUTION: Illustration comparing toe-in and toe-out gait patterns to unchanged gait. This shows how force distribution shifts from the medial knee to the center to alleviate knee pain.

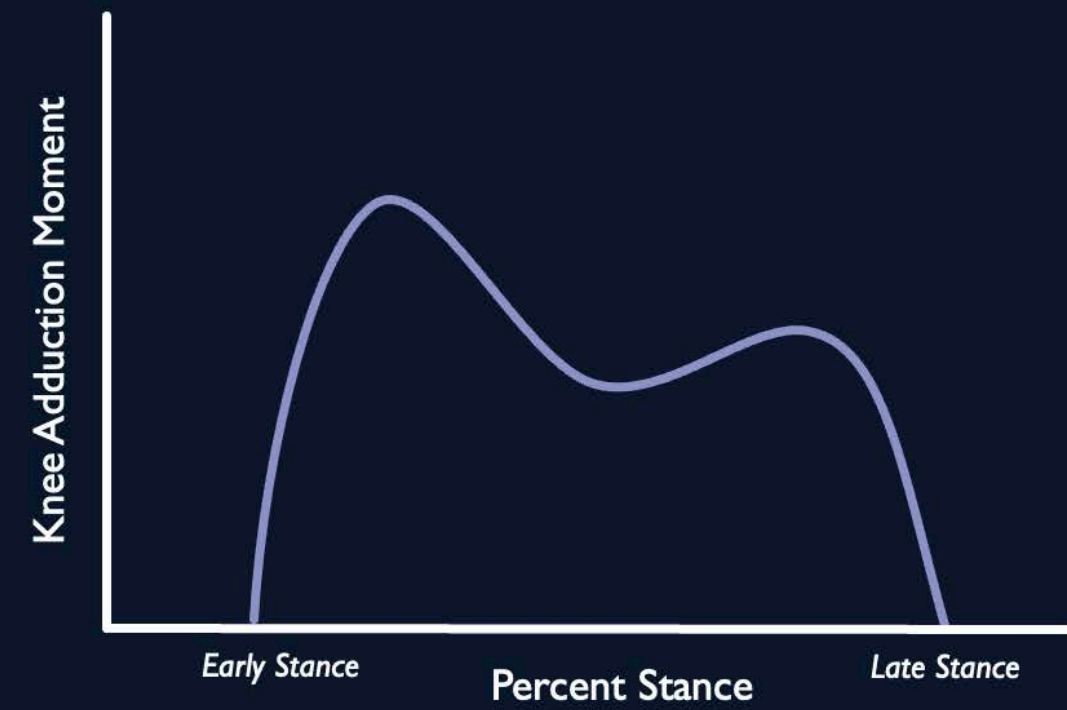
OUTCOME: Investors quickly understand the mechanism, clinicians can understand the therapeutic approach, and patients understand the intervention.



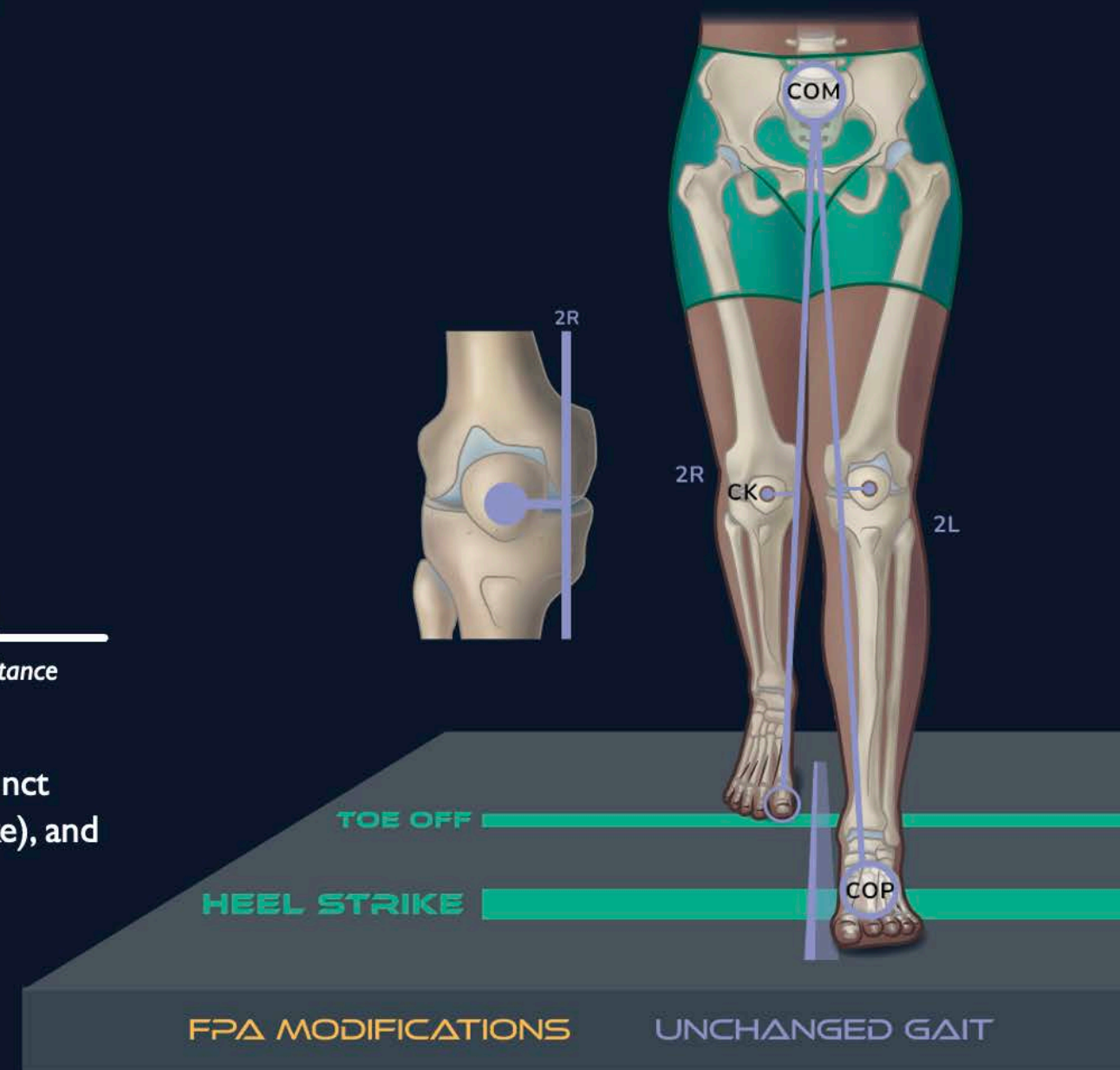
Case 2

PITCH DECK EXAMPLE

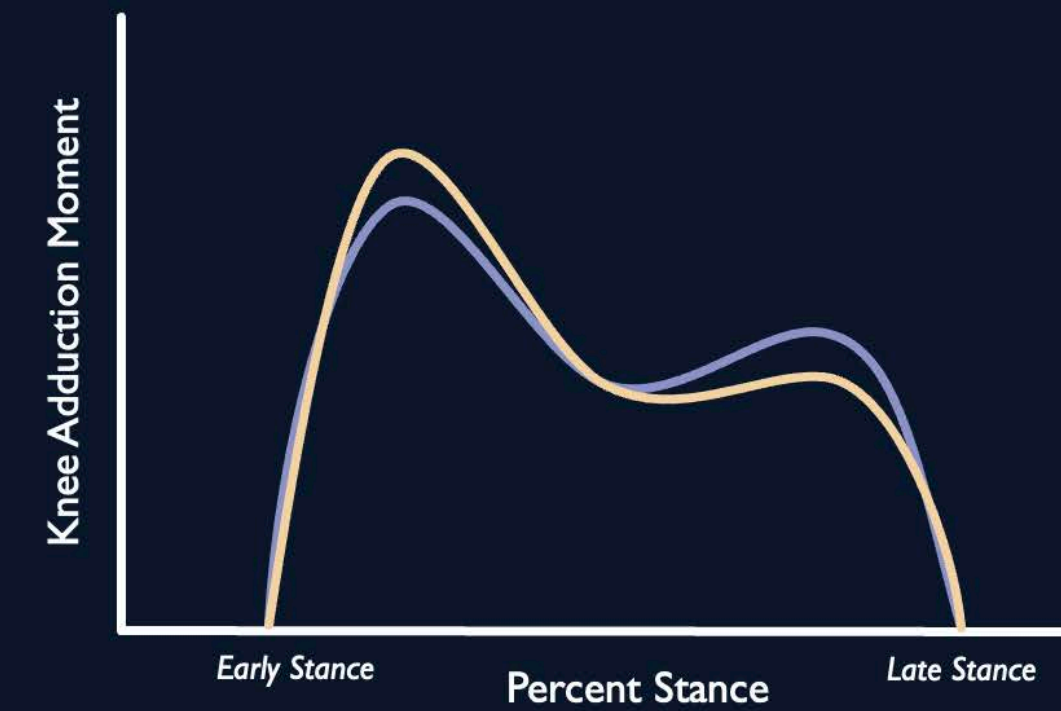
BACKGROUND – UNCHANGED GAIT



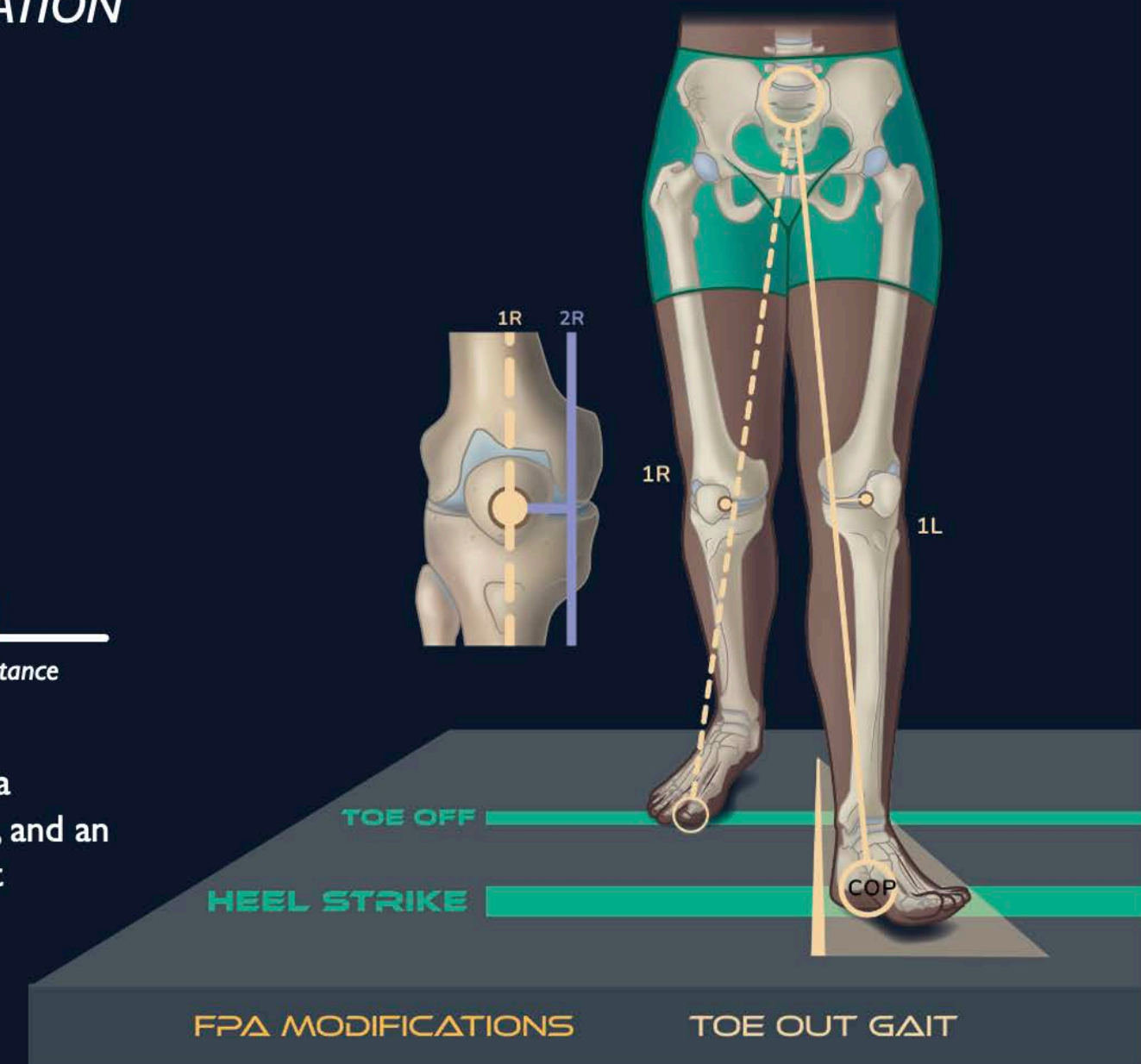
A typical knee adduction moment plot has 2 distinct peaks: the first peak being early stance (heel strike), and the second peak being late stance (toe off)



BACKGROUND – TOE OUT MODIFICATION



When we adopt a Toe-OUT gait pattern we see a decreases in late stance knee adduction moment, and an increases in early stance knee adduction moment



Case 3

VISUALIZING SURGICAL SYSTEMS AND PROTOTYPE TECHNOLOGIES

CONTEXT: Robotic systems combine surgical tools, navigation sensors, and computer modeling to assist surgeons.

COMMUNICATION NEED: It can be difficult to understand how complex medical technologies work in practice. This is also a challenge for emerging medical technologies and prototype systems where the final product or clinical workflow may not yet exist.

AUDIENCE: Investors, surgeons, hospital decision makers, device developers.

VISUAL SOLUTION: Illustrated surgical workflow showing how the probe attaches to the bone, how the anatomical data is registered, and how the computer system guides surgical decisions and protects key structures. The same approach can be used to visualize prototype technologies.

OUTCOME: Clinicians and hospital decision makers understand new technologies, and emerging technologies or prototype can be clearly communicated before final development.

The Role of the Robot

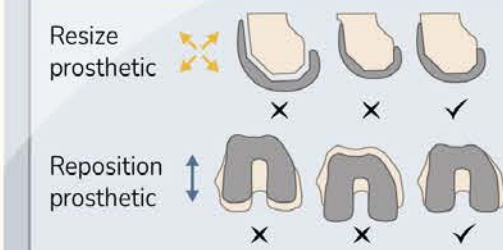
Step 1: Pre-operative plan

Planning before surgery

Before surgery, the robot uses a CT-scan to create a 3D image of your bones, allowing surgeons to create a personalized plan of how the implant will fit.

Robot Computer Screen

Pre-operative plan

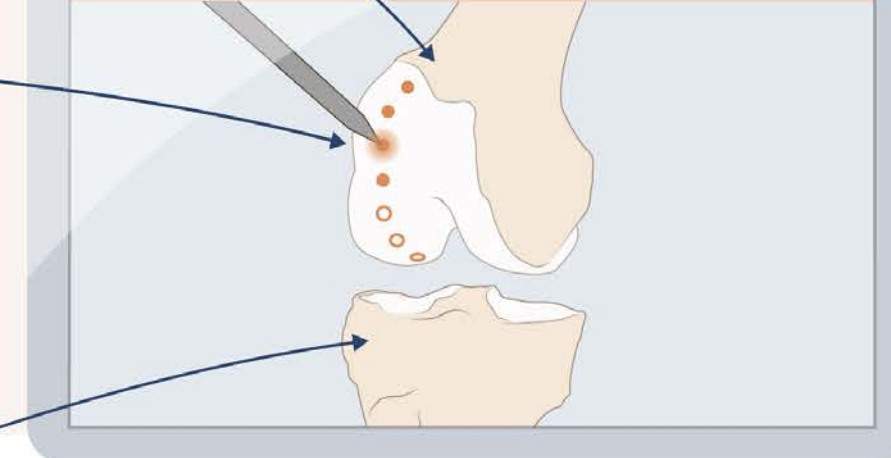


Step 2: Landmarking

Telling the robot where things are

At the start of the procedure, a device with sensors called an array(1) is attached to your thigh(2) and shin(3) bone to provide the robot with real-time bone position and movement data. The surgeon will also use a probe(4) to refine the robots understanding of your specific anatomy.

Landmarking

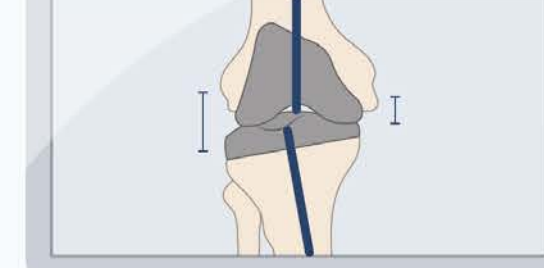


Step 3: Ligament balancing

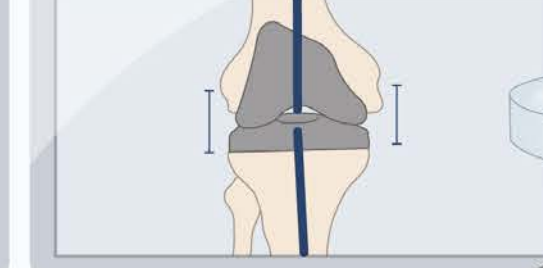
Adjusting the plan

The robot now has more information about your knee, including the tension in the ligaments holding bones together. Surgeons use this to modify the initial plan, ensuring ligament tension is balanced before any bone is cut.

Ligament balancing



Ligament balancing

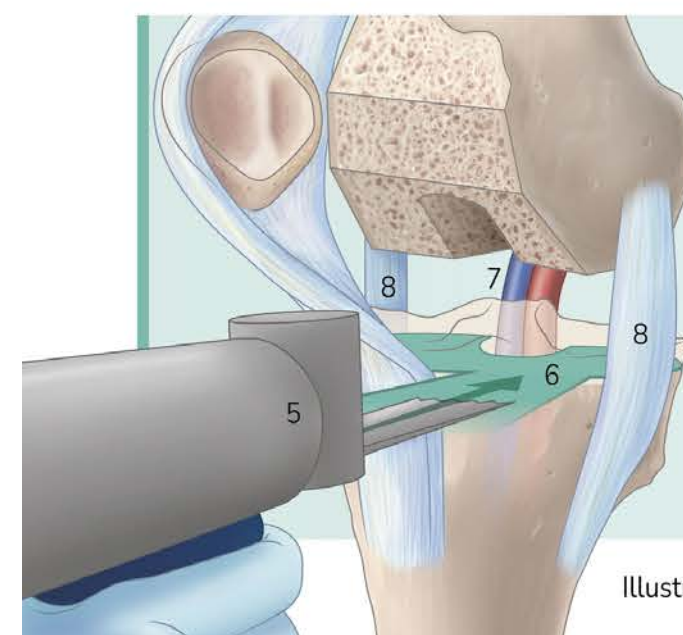
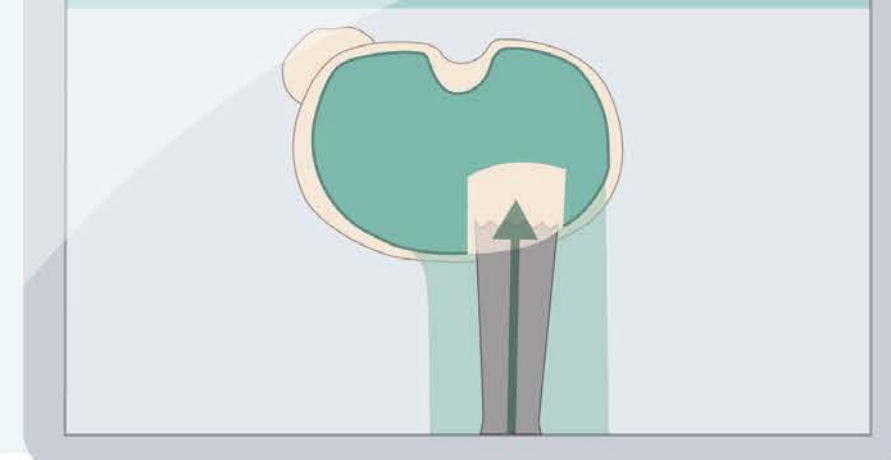


Step 4: Bone Preparation

Removing damaged cartilage

The surgeon prepares the knee for the implant by removing damaged cartilage with the robotic bone saw(5). The surgeon controls the saw but the robot ensures precise cuts are made by only allowing movement along the **virtual plane of the cut(6)**, and automatically stops if the saw goes too far, protecting surrounding tissues like blood vessels(7) and ligaments(8).

Bone preparation



Illustrations and poster design by Olivia Symons



Treating ALK+ Lung Cancer

ALK is a protein that is important while we are in the womb

Everyone has the **ALK gene**, which contains instructions for making the **ALK protein**. This gene is normally active before birth, allowing the ALK protein to be made.

The protein is briefly switched on by a molecule called a **ligand** - like a quick high-five. This **temporary activation** helps the gut and nervous system develop.

Usually the ALK gene is turned off after we are born

In people with ALK+ lung cancer, the ALK gene is turned back on by a random mutation

50% UNDER 50

2/3 HAVE NEVER SMOKED

PEOPLE OF East Asian ETHNICITY

Targeted Therapy

Radiation

Chemotherapy

Surgery

Targeted therapy such as ALK inhibitors are the most common first treatment. This is because most ALK+ lung cancers respond best to this method. In some cases, your healthcare team might explore radiation, chemotherapy, or surgery

Stages of cancer:

EARLY STAGES

Stage 1: the tumor is 4cm or smaller

Stage 2: the tumor is 3-7cm but has not spread to other organs.

LOCALLY ADVANCED

Stage 3: the tumor has grown into tissues and lymph nodes in the chest.

METASTATIC

Stage 4: Cancer has spread to one or more organs outside the chest.

Outlook for people living with ALK+ lung cancer

ALK+ lung cancer is often caught in the later stages in which it cannot be cured. Targeted therapies like ALK inhibitors are very effective at treating ALK+ lung cancer.

In recent years, great strides have been made in ALK+ lung cancer treatment and as research continues the outlook for those living with ALK+ is expected to continue to improve

glans-look LUNG CANCER RESEARCH

PROPEL

Illustration and design by Olivia Symons

ALK+ Lung Cancer

There are two types of lung cancer:

Non small cell lung cancer makes up 85% of all lung cancer cases

Small cell lung cancer makes up 15% of all lung cancer cases

5% of these cases are ALK+

ALK+ cancer is caused by a genetic mutation:

Everyone has the **ALK gene**, which contains instructions for making the **ALK protein**. A random DNA mutation can cause the ALK gene to fuse with another gene, most often **EML4**. This fusion turns the ALK gene on and produces abnormal **ALK-fusion proteins**. Unlike normal ALK proteins, these fusion proteins send signals that turn cells cancerous.

Who gets ALK+: 50% UNDER 50, 2/3 HAVE NEVER SMOKED, PEOPLE OF East Asian ETHNICITY

Treatment Options

Targeted Therapy

Radiation

Chemotherapy

Surgery

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glans-look LUNG CANCER RESEARCH

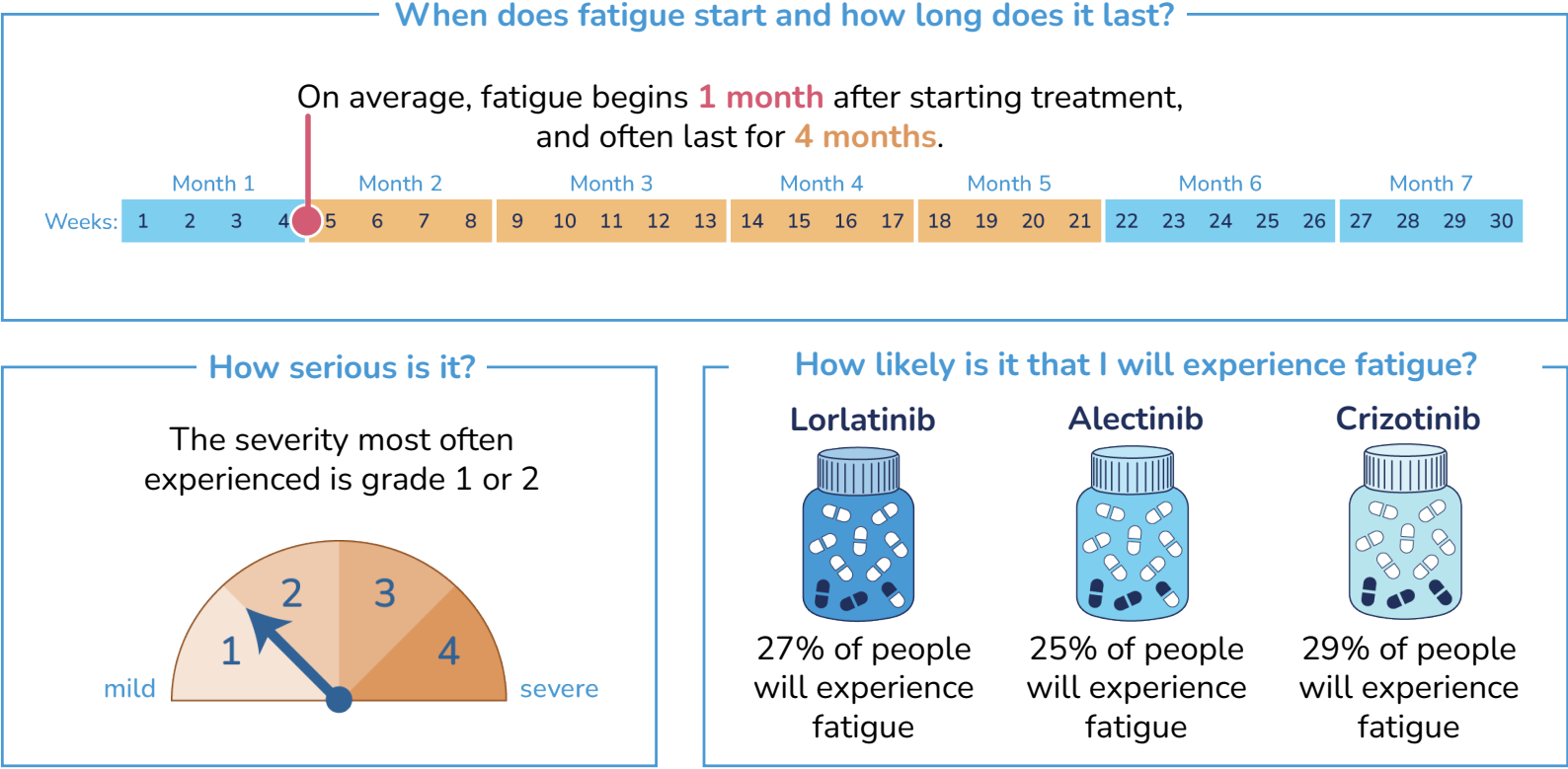
PROPEL

Illustration and design by Olivia Symons

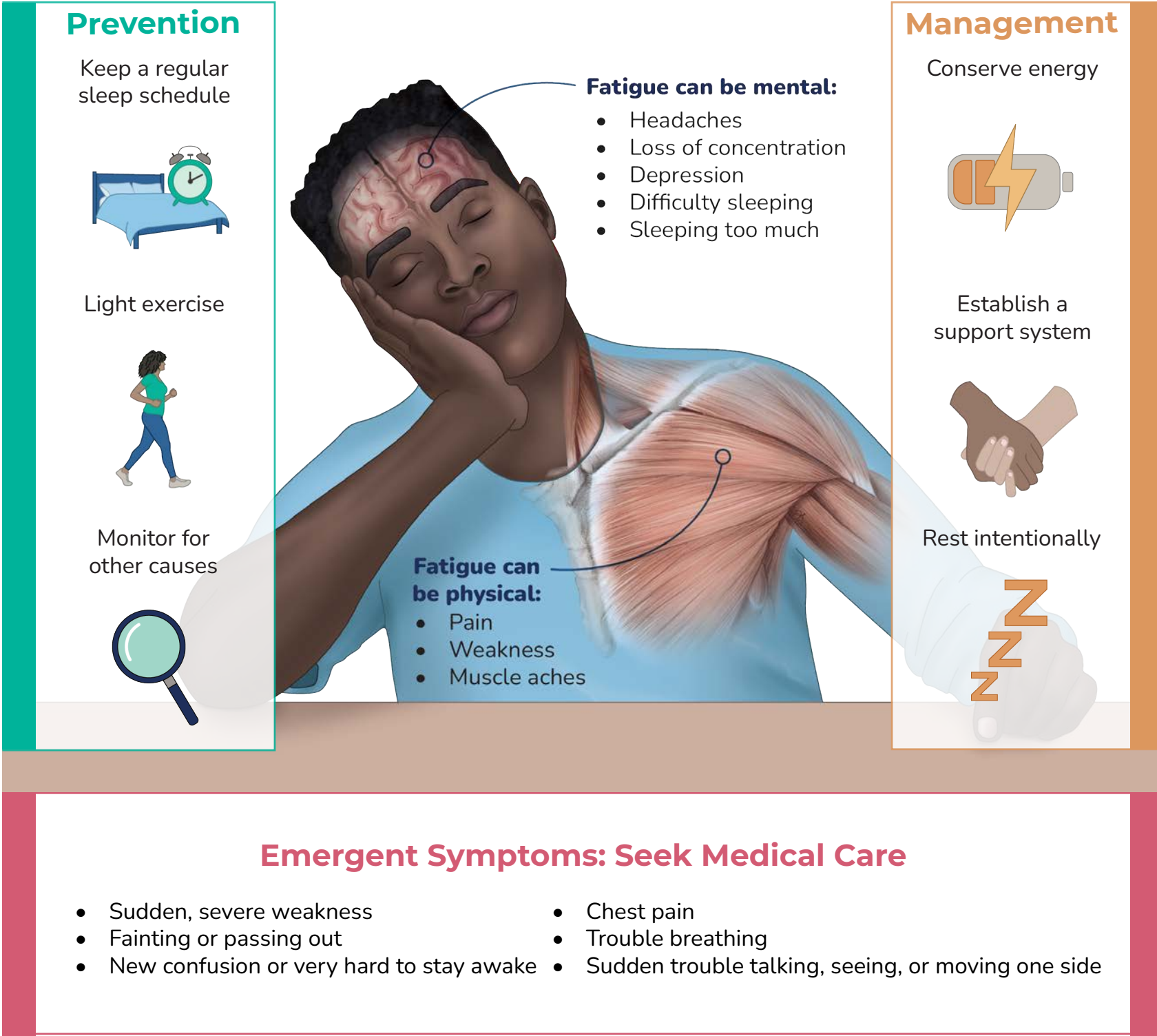
ALK+ Lung Cancer
2026
Patient education material created for Glans-Look research group from the University of Calgary. Infographics explain ALK+ lung cancer facts and biology to a patient audience.
Graphite pencil, Adobe Photoshop, Adobe Illustrator

Fatigue

tiredness not relieved by rest

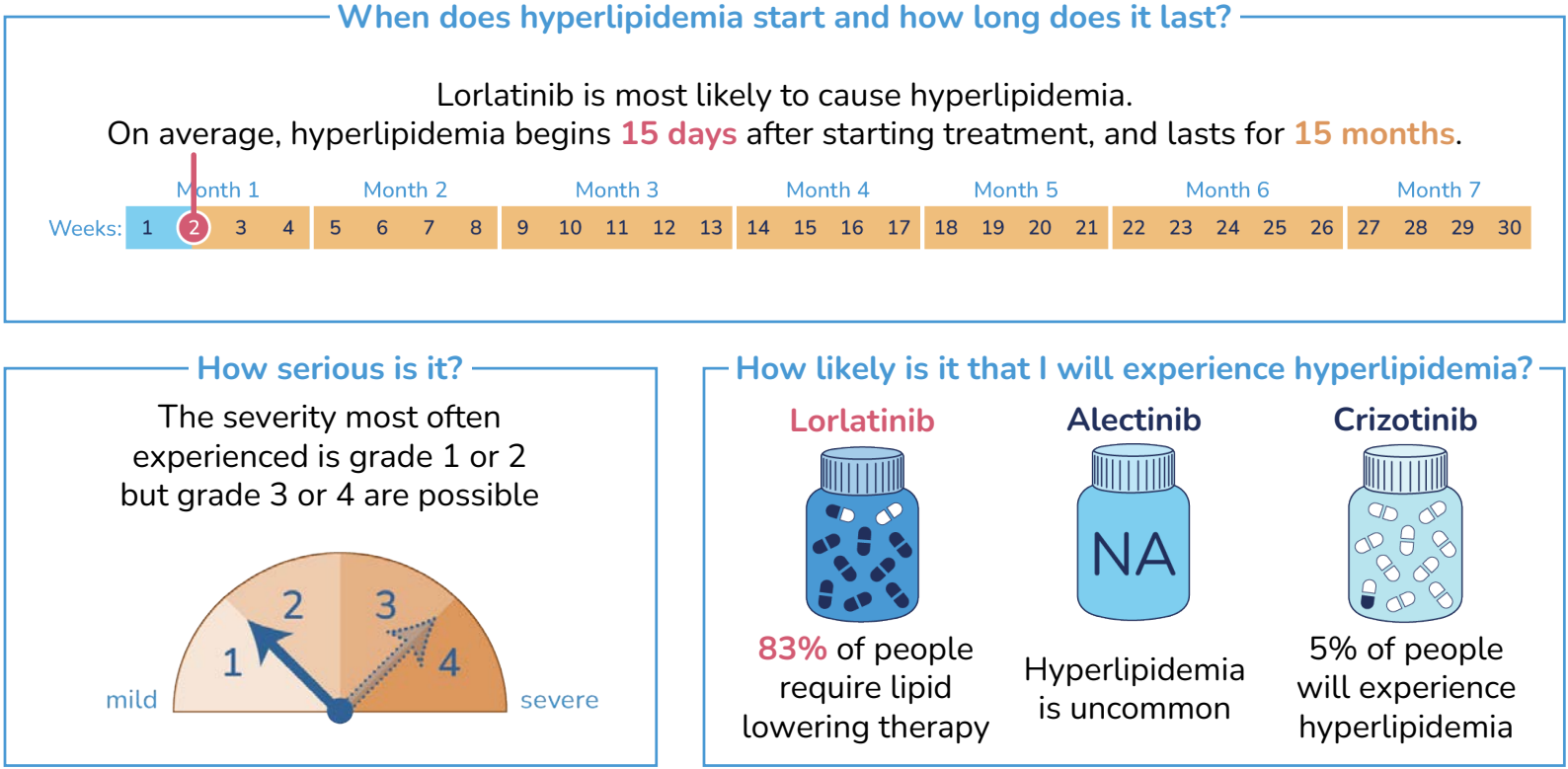


Symptoms of Fatigue

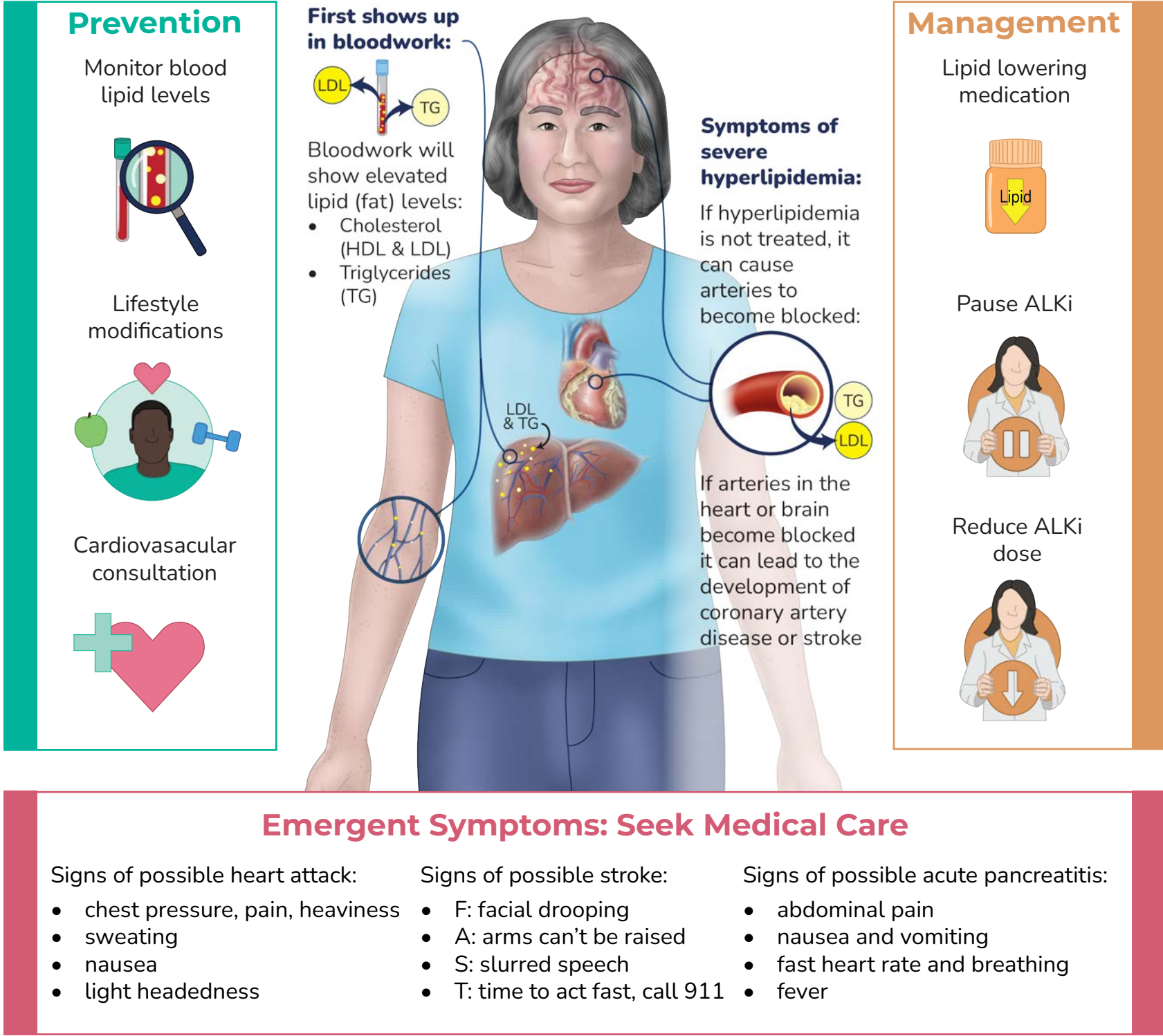


Hyperlipidemia

high cholesterol or triglyceride (fat) levels in blood



Symptoms of Hyperlipidemia



ALK Inhibitor Side Effects
2026

Selected infographics from a series of six patient education materials created for Glans-Look research group from the University of Calgary. Infographics explain comon side effects caused by ALK inhibitor medications in the framework of prevention, management and emergent symptoms.

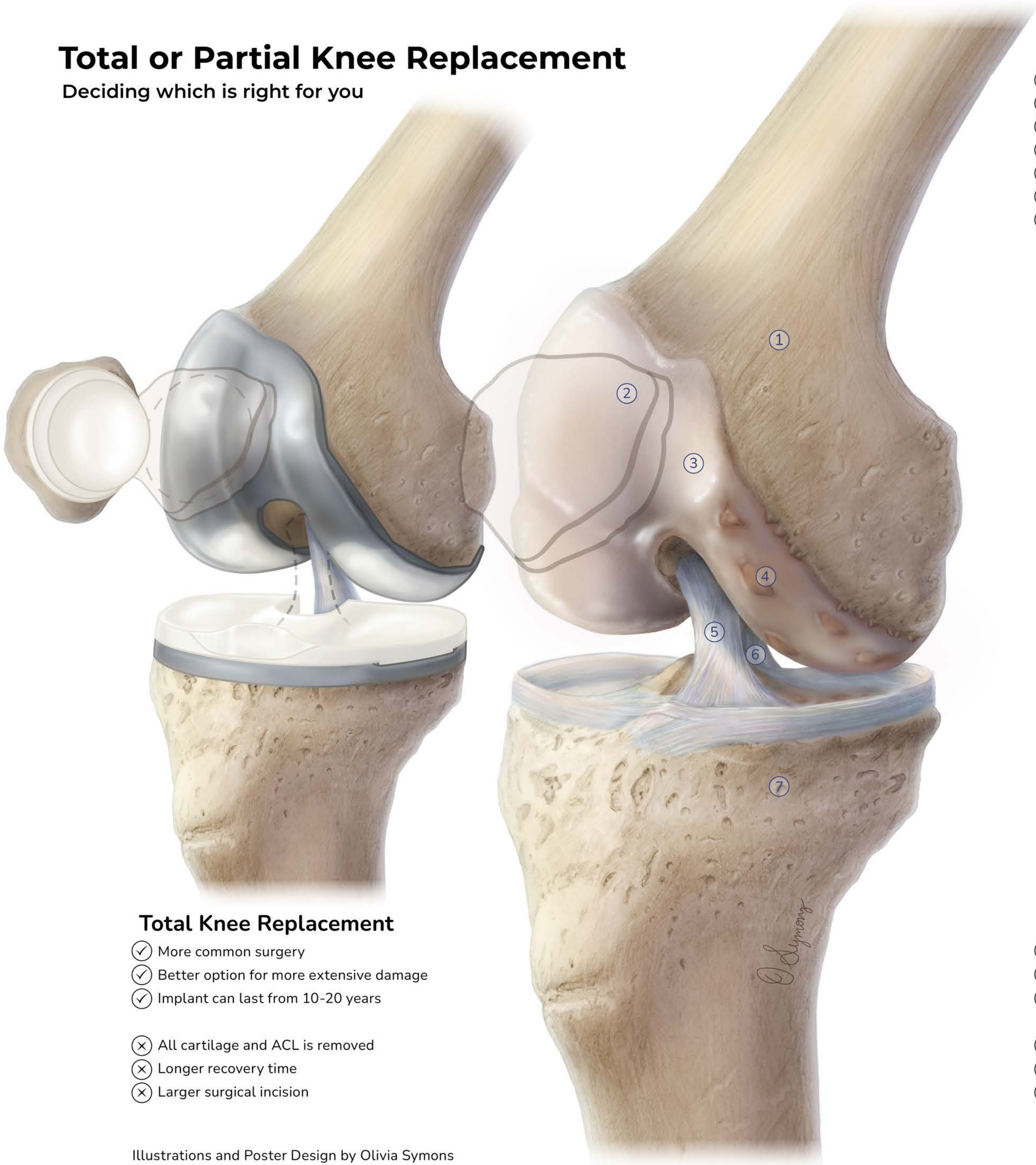
Graphite pencil, Adobe Photoshop, Adobe Illustrator

COMPARISON

Total or Partial Knee Replacement

Deciding which is right for you

- ① Femur (thigh bone)
- ② Patella (knee cap bone)
- ③ Cartilage
- ④ Osteoarthritis damage
- ⑤ ACL (ligament)
- ⑥ PCL (ligament)
- ⑦ Tibia (shin bone)



Total Knee Replacement

- ✓ More common surgery
- ✓ Better option for more extensive damage
- ✓ Implant can last from 10-20 years
- ✗ All cartilage and ACL is removed
- ✗ Longer recovery time
- ✗ Larger surgical incision

Partial Knee Replacement

- ✓ Feels more like a natural knee
- ✓ Shorter recovery time
- ✓ Smaller surgical incision
- ✗ Difficult surgery without robotic assistance
- ✗ Does not always last as long
- ✗ Higher risk of needing a second surgery

Unicompartmental

One compartment is replaced



Medial (inside)



Lateral (outside)



Patellofemoral (top)

Bicompartmental

Two compartments are replaced

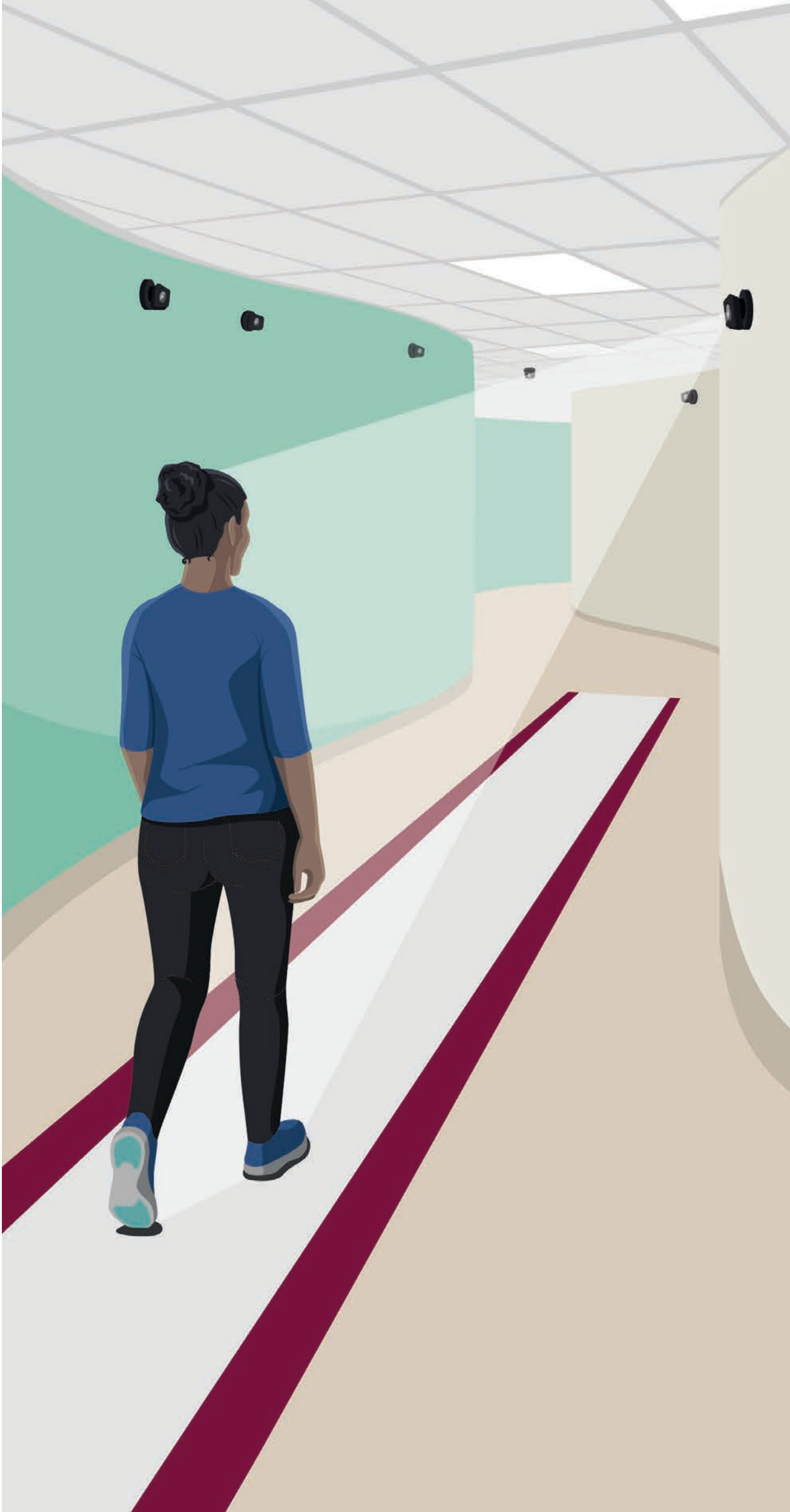


Medial patellofemoral

Total or Partial Knee Replacement
2025
Patient education material created for St. Josephs Healthcare Hamilton as part of my master thesis explaining the differences between total and partial knee replacements to individuals with osteoarthritis taking part in clinical research.
Graphite pencil, Adobe Photoshop, Adobe Illustrator

CLINICAL
TRIAL
VISUALIZATION

IN LAB

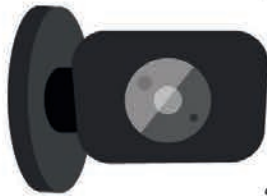


In Lab and Life:
Osteoarthritis
Functional Severity
Report Infographic
2025

Infographic explaining the biomechanic study to participants. With this visual explanation, participants will better understand the research they are supporting and be encourage to participate in the optional data collection “in life”.

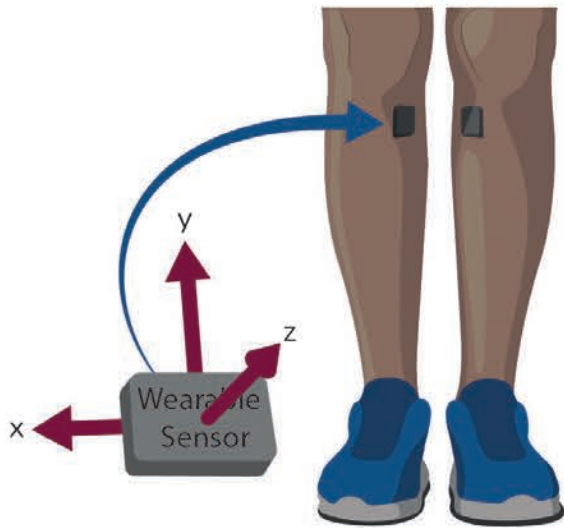
Adobe Illustrator

DATA COLLECTION

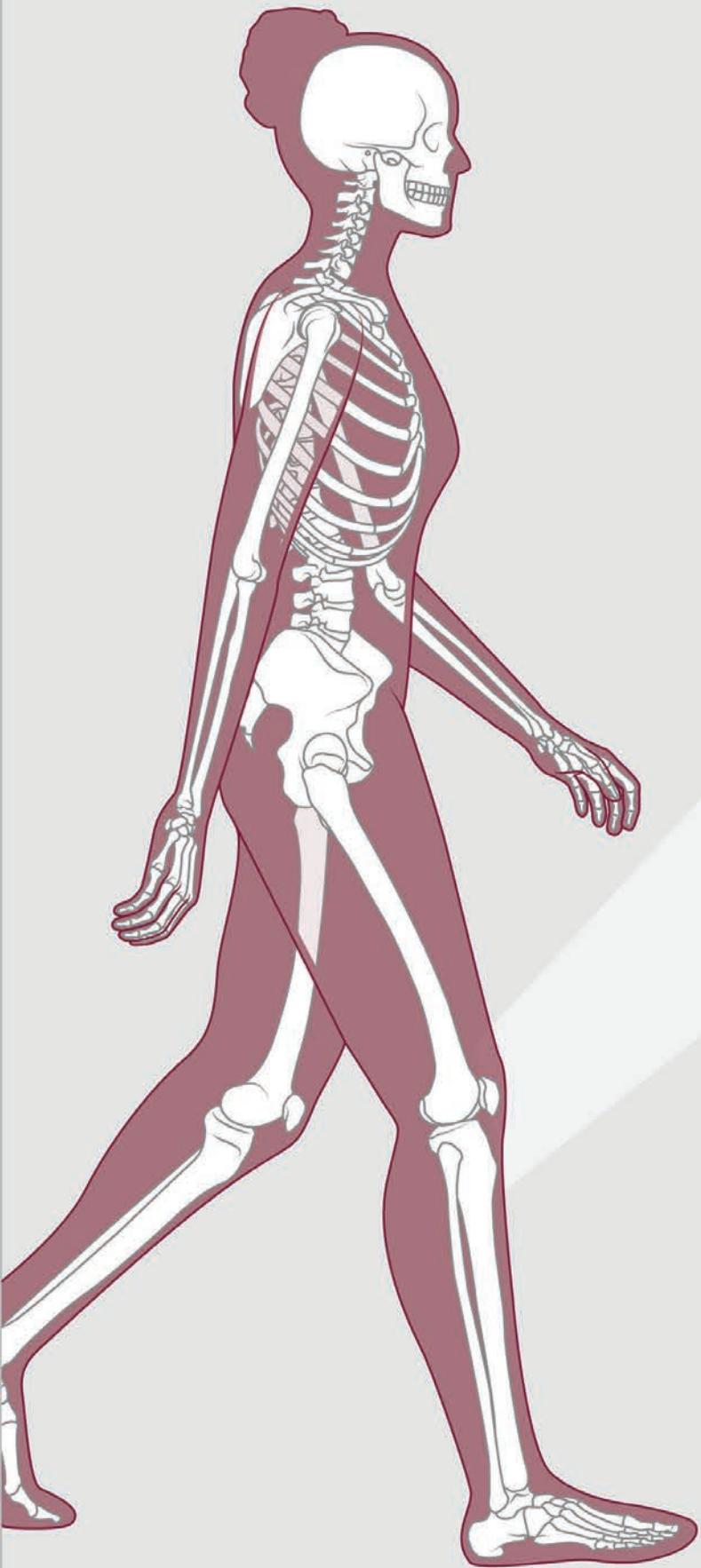


Video footage is collected in lab and afterwards the Theia 3D software overlays a skeleton which allows biomechanic data to be collected for the functional severity report.

Participants can also agree to wear sensors that collect additional data. These sensors detect movement in three planes of motion (x, y, z) and give a more holistic functional severity report.



THE FUNCTIONAL
SEVERITY REPORT



Over the course of the study, biomechanic data is collected from both healthy, and osteoarthritic participants. If osteoarthritic participants seek surgical intervention, data will be collected before and after knee surgery.

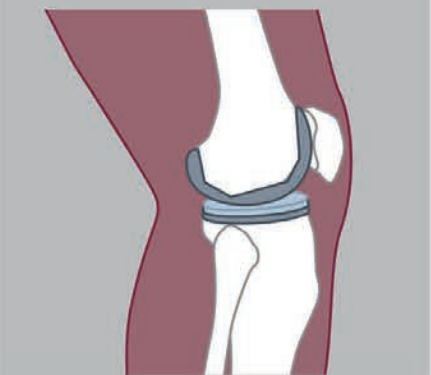
This data allows researchers to study biomechanic parameters, such as knee flexion between the various groups. With this understanding of the biomechanics behind osteoarthritis, researchers can make functional severity reports, and clinicians can implement the findings for more personalized treatment approaches.

NORMAL
RANGE OF
MOTION

HEALTHY KNEE FLEXION

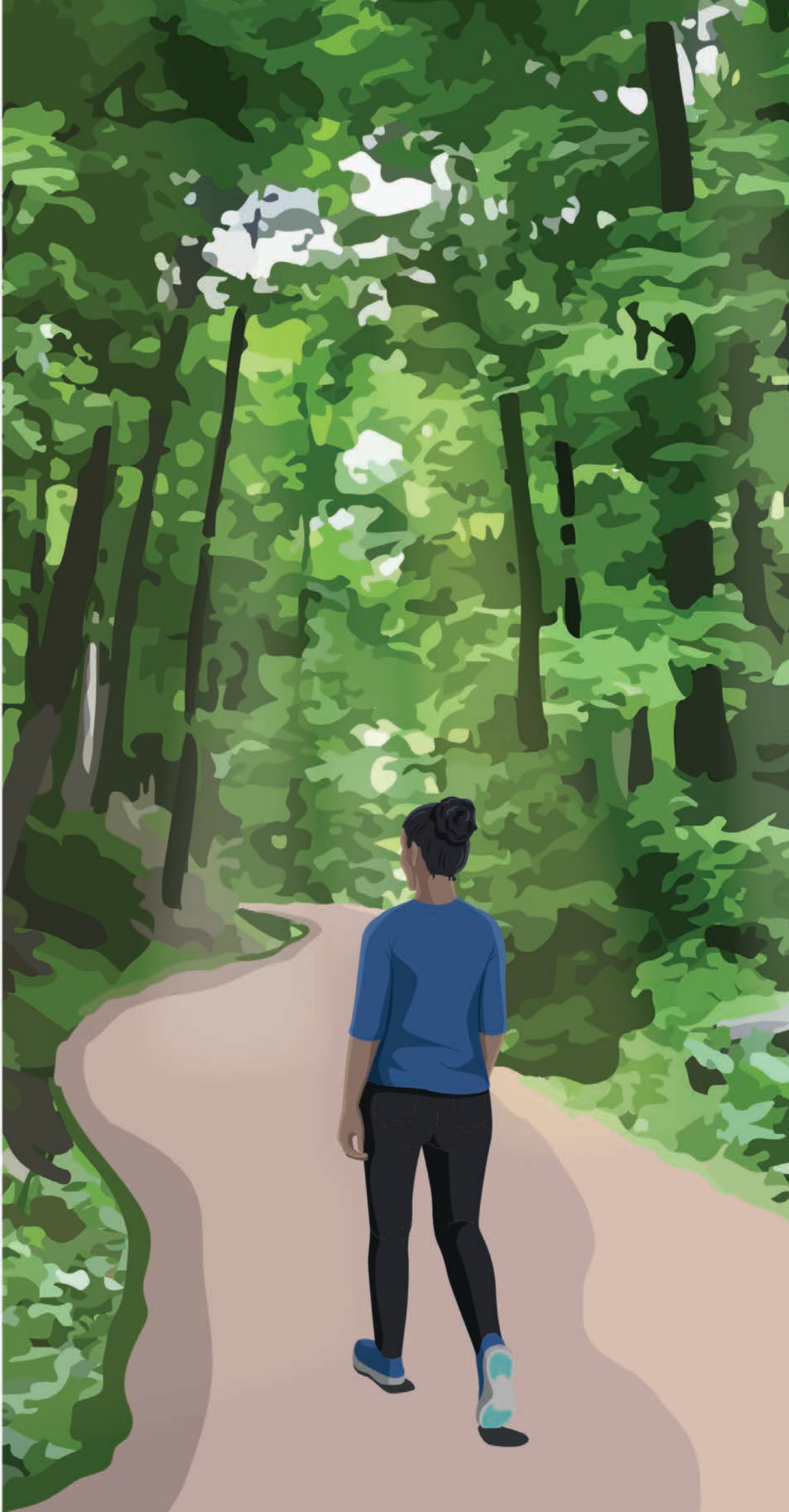


POST-SURGERY KNEE FLEXION



REDUCED
RANGE OF
MOTION

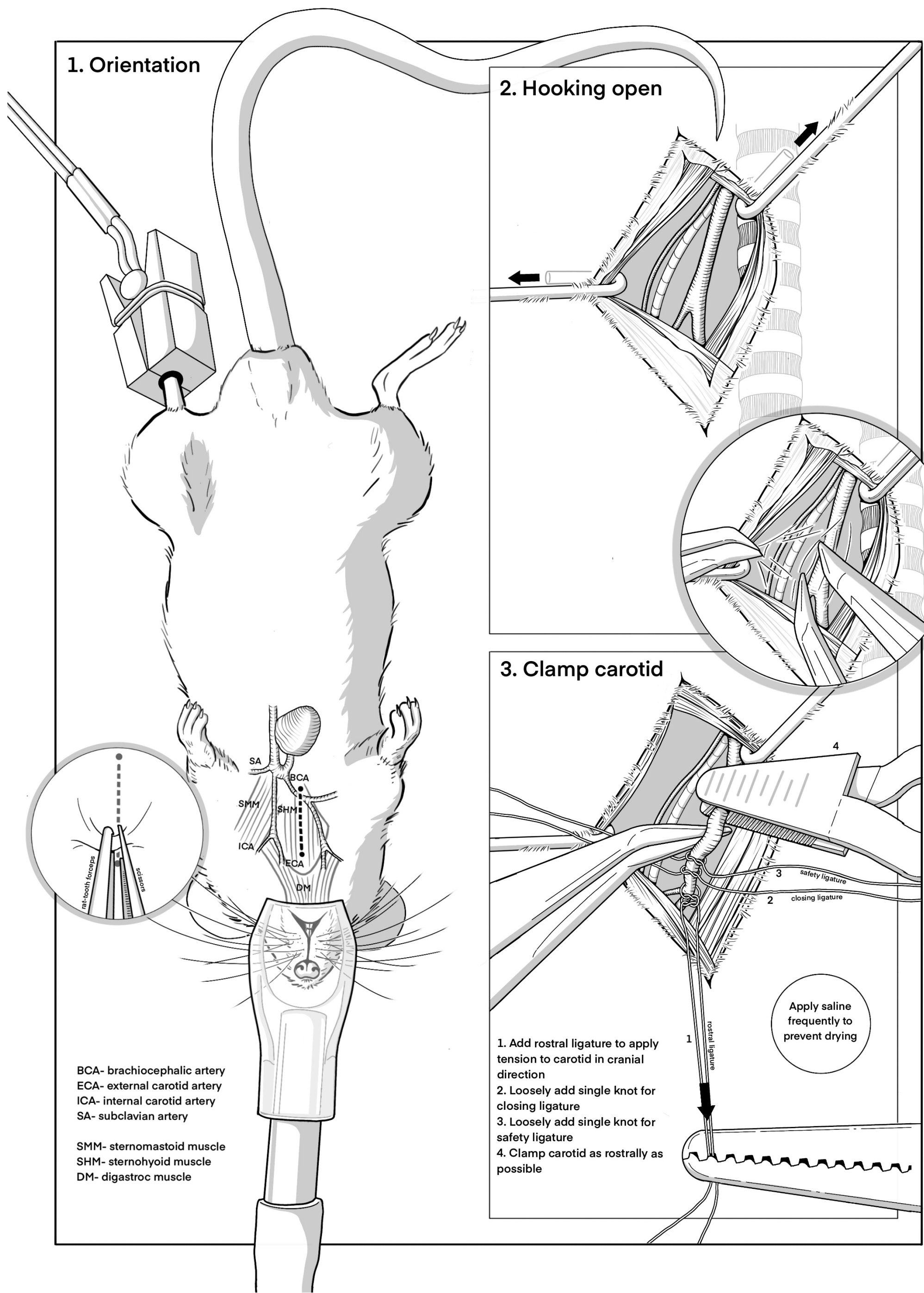
OSTEOARTHRITIC KNEE FLEXION



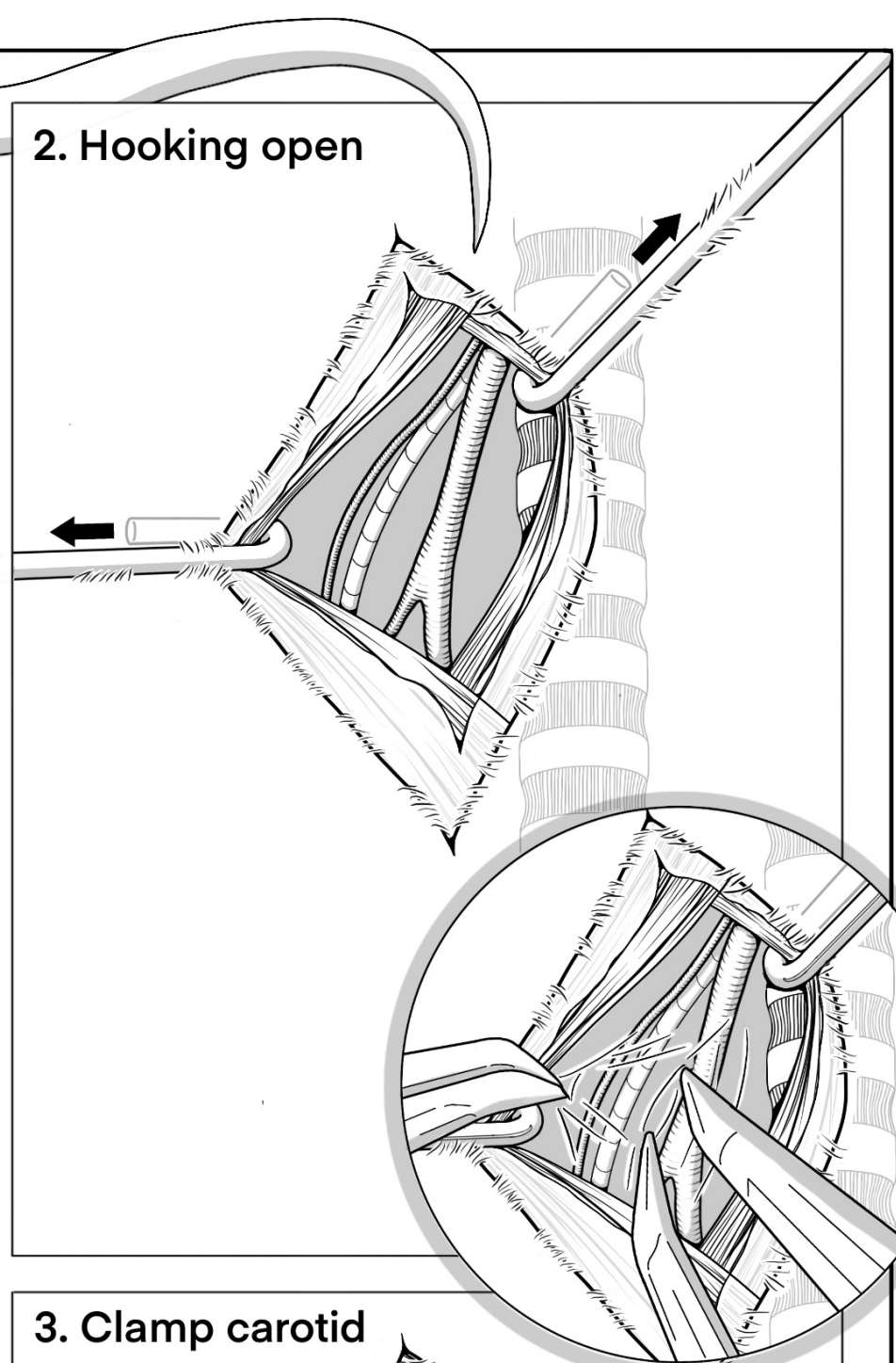
& LIFE

PROCEDURAL
ILLUSTRATIONS

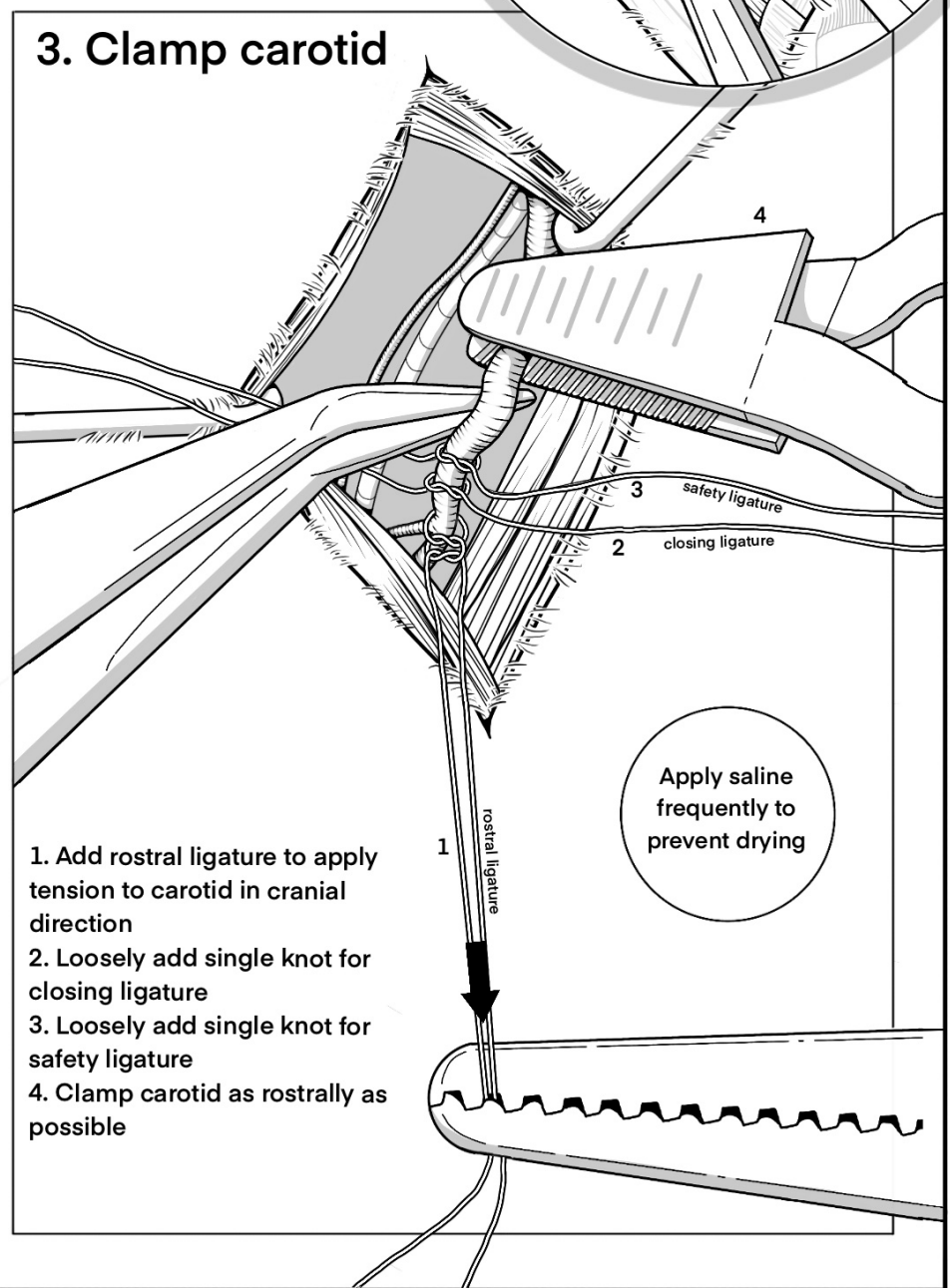
1. Orientation



2. Hooking open



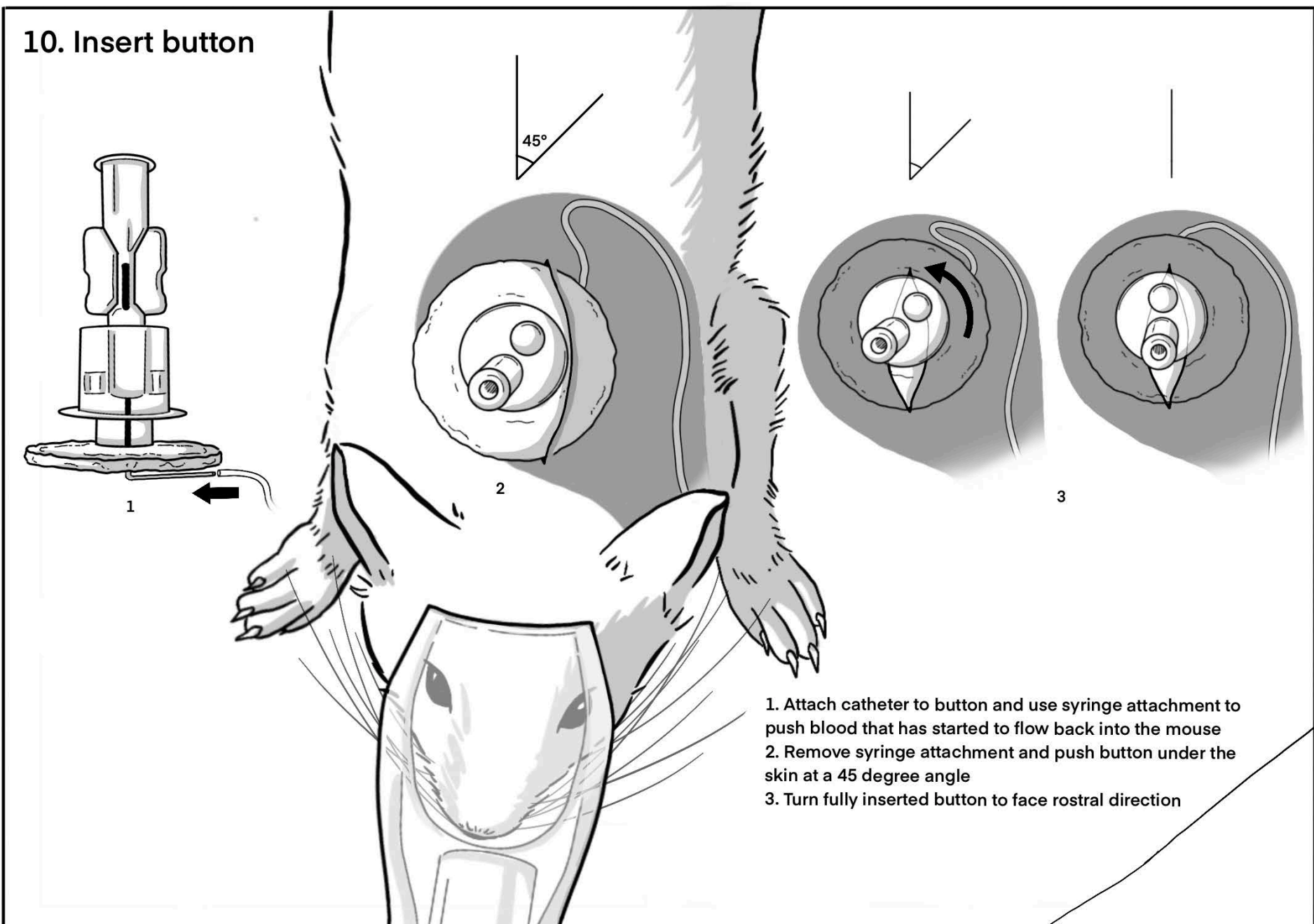
3. Clamp carotid



1. Add rostral ligature to apply tension to carotid in cranial direction
2. Loosely add single knot for closing ligature
3. Loosely add single knot for safety ligature
4. Clamp carotid as rostrally as possible

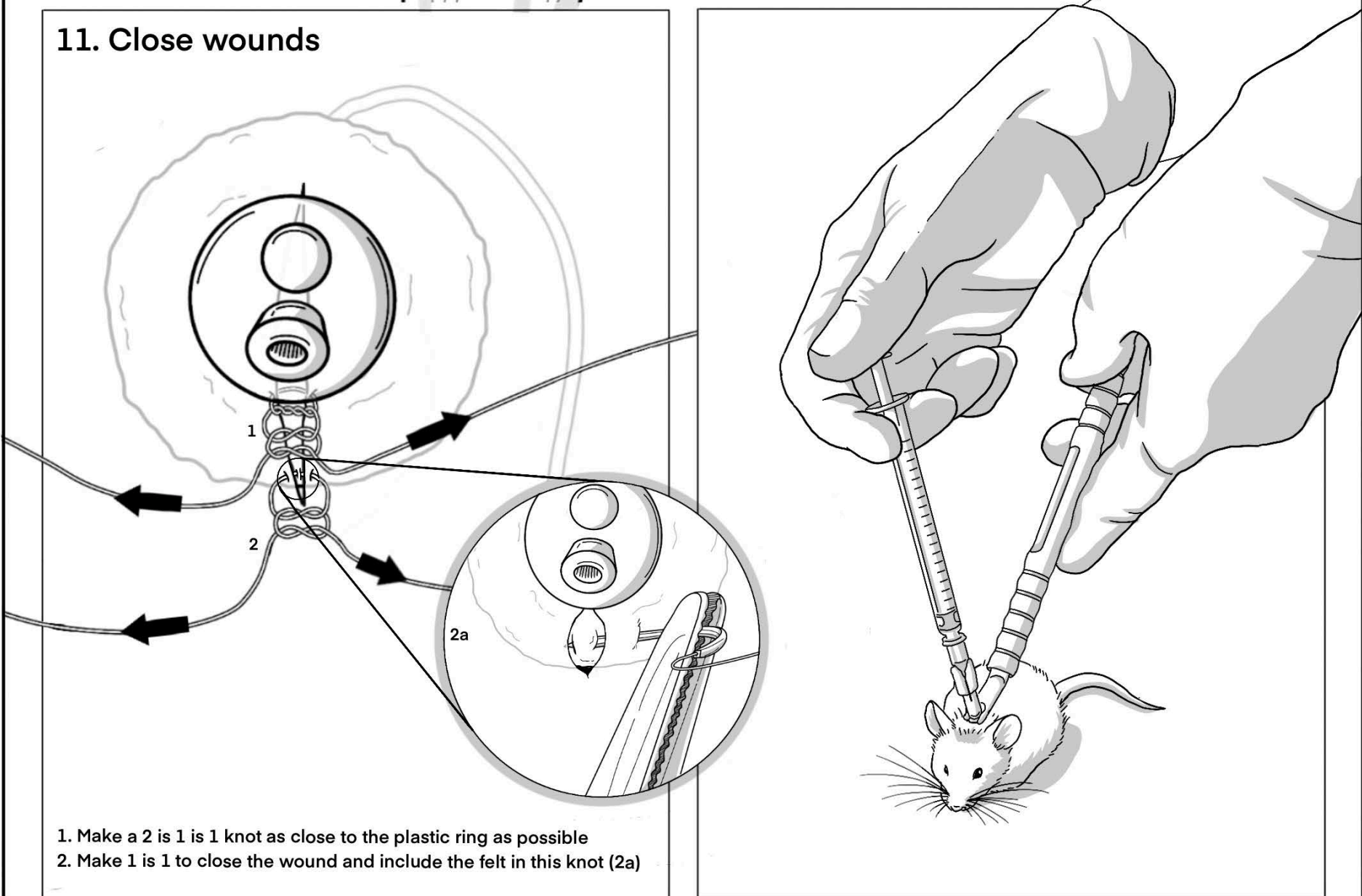
Apply saline frequently to prevent drying

10. Insert button



1. Attach catheter to button and use syringe attachment to push blood that has started to flow back into the mouse
2. Remove syringe attachment and push button under the skin at a 45 degree angle
3. Turn fully inserted button to face rostral direction

11. Close wounds



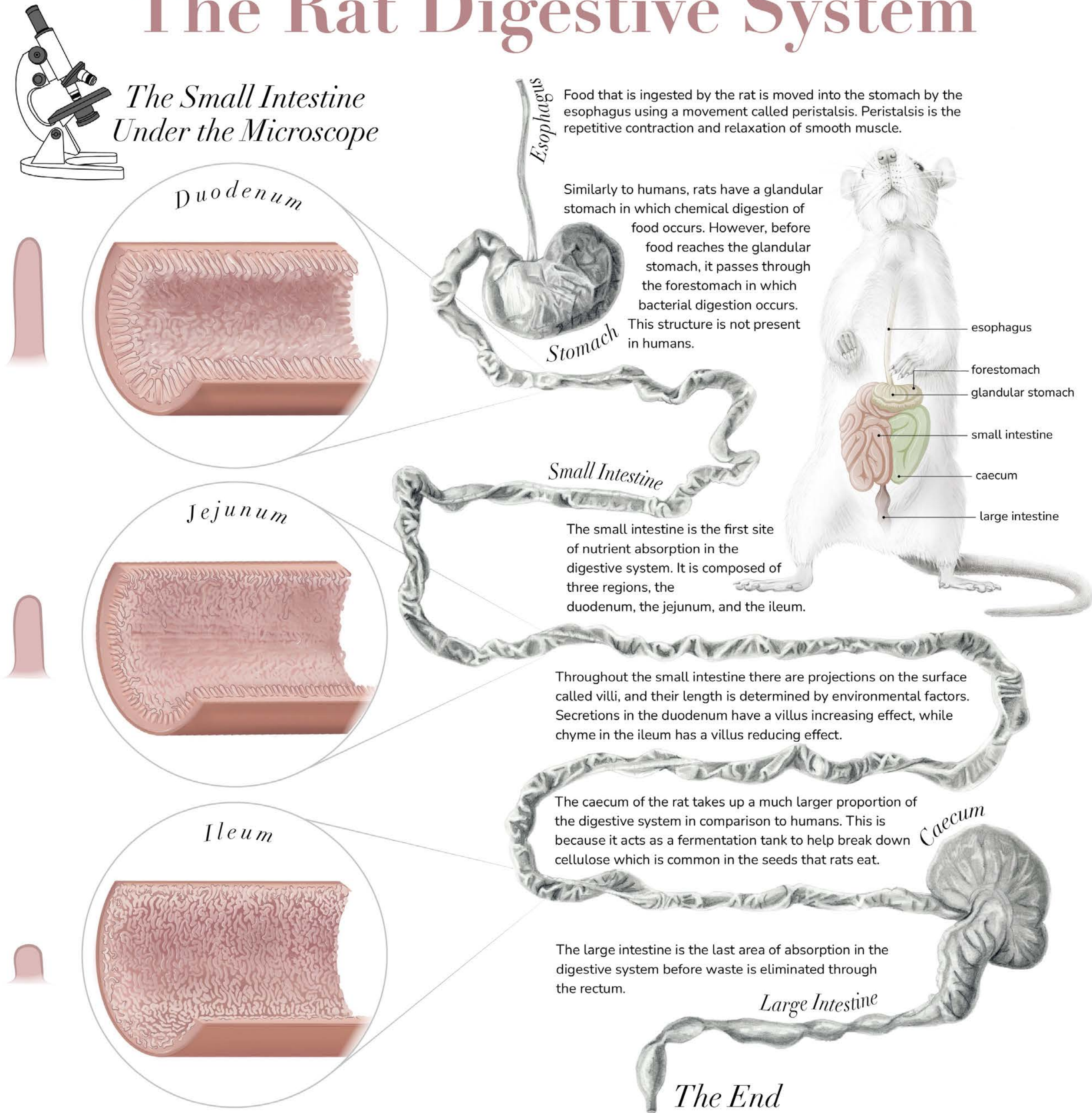
Selection of Mouse Microsurgery
Manual Steps

2024

Microsurgical procedure of the catheterization of the carotid artery performed on the laboratory mouse. Illustrations were made based on observation of the procedure at René Remie Surgical Skills Center in Almere, NL.

Procreate

The Rat Digestive System



The Rat Digestive System

2023

Poster based on dissection of the laboratory rat highlighting the digestive system. Focus is placed on the small intestine and how villi size changes throughout based on cross-sectional observations under the microscope.

Graphite pencil, Procreate, Adobe Illustrator, Adobe Illustrator



Lets Work Together
THANK YOU

osymonsillustration.com
oliviafsymons@gmail.com