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Sesi Perkongsian Pemenang PiCTL2020

#MUSICANATOMY#

Learning Anatomy Through Song and Music

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PicTL 2020

Gold Medal International Putra Innocreative Poster Competition



PicTL 2020
 INTERNATIONAL PUTRA
 INNOCREATIVE POSTER
 COMPETITION
 22 – 30 Oct

#MUSICANATOMY
**LEARNING ANATOMY THROUGH
 SONG AND MUSIC**

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- New Approach in Teaching & Learning Anatomy Curriculum:**
- ✓ To develop & implement a musical based approach in learning the function of muscles in upper and lower limbs.
- Immersive Learning:**
- ✓ To evaluate the effect of the newly developed learning approach on medical students' level of academic performance (understanding/knowledge), interest, stress, and happy index.

Objectives

Human anatomy is the identification and description of the structures of the human body. An understanding of anatomy is fundamental to the practice of health and medicine, and all medical students need knowledge of anatomy. However, among students studying medicine, the medical curriculum is often challenging and the anatomy course is regarded as intense and difficult requiring a lot of memorization. Therefore, to ease and support the learning and memorization process of anatomy, the **immersive learning** technique is employed into the medical curriculum. For a demanding and rigid course such as anatomy, immersive learning provides a highly engaging learning environment for students consisting of virtual and physical inter-activities by implementing and maximizing the advantages of technology. To ensure students can become completely immersed in the learning process and memorization of anatomy, **original anatomy songs** are composed specifically for particular muscles of the upper and lower limbs in the anatomy curriculum such as hand muscles. After critically identifying and selecting the lyrics and texts of the song from anatomy terms, the form of the music is then planned out to ensure continuation and flow of music and phrases of terms. The main concept of the anatomy song is determined as catchy and lively and therefore rhythmic patterns of the song are also designed to guarantee active rhythms that can accompany energetic dance movements. The culmination of this research project is to combine the anatomy song with choreographed movements into an audio-visual video product. This recorded video is then to be copyrighted and supplemented into the medical curriculum used in anatomy courses. The deliberate intention of the composition of anatomy songs is to enable students to easily memorize anatomy terms and subsequently reduce their stress and anxiety in learning anatomy. Music is known to help in memorization processes whereby it is easier to recall words by music and singing. At the same time, music helps lessen students stress levels during learning and become more motivated, excited, and immersive learning such as learning anatomy through songs can stimulate students learning process leading on to improved learning experiences and students success in anatomy.

Keywords: *Anatomy, anatomy and music, Immersive learning, song, music and medicine*



Recognition

Anatomy

Foundation of medical science

Bodily structure of humans, body parts

Rote memorization

*Music –
Anatomy songs*

Immersive Learning

Inter-activities, simulation

Students immersed in the learning process

Objectives

New Approach in Teaching & Learning Anatomy Curriculum:

- ✓ To develop & implement a musical based approach in learning the function of muscles in upper and lower limbs.

Immersive Learning:

- ✓ To evaluate the effect of the newly developed learning approach on medical students' level of academic performance (understanding/knowledge), interest, stress, and happy index.

Value Added

Another kind of learning:

- ✓ A new, fun, and attractive way of learning anatomy.
- ✓ Encourages and improves the interest, academic performance, and happy index of medical students in anatomy courses.
- ✓ Students memorise better.

Compositional Process

Anatomy Songs

CULMINATION (FINAL PRODUCTS)

- File for **copyright and Intellectual Property IP (music album)**
- Develop new updated anatomy **learning method (immersive learning)**
- Implementation into **medical curriculum**



Human anatomy

- All the **muscles** of the human body are identified.
- All the muscles of the human body are classified into muscles of **upper and lower limbs**



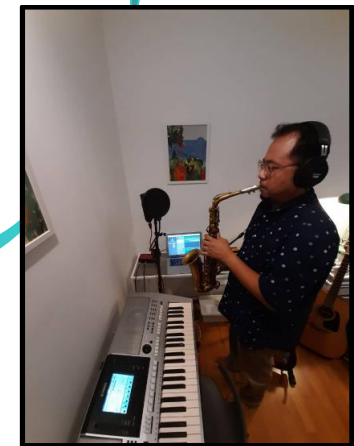
Original Song Compositions

- Decide on catchy **rhythms** of the song
- Establish the **harmony** and chord progressions of the song.
- Create a specific and 'catchy' **melody** for song.
- Songs are **recorded** with vocalist.



Lyric writing

- Important **anatomy terms** are determined to be included into song lyrics.
- **Lyrics** are then written according to Hand, Arm, Leg, Thigh, and Foot.



GIPP

Muscles of Upper limb

Anterior Compartment of Arm:

1. Biceps Brachii (Musculocutaneous N)
 - a. Elbow flexion
 - b. Forearm supination
 - c. Shoulder flexion
2. Coracobrachialis (Musculocutaneous N)
 - a. Shoulder flexion
 - b. Shoulder adduction
3. Brachialis (Musculocutaneous + Radial N)
 - a. Elbow flexion

Posterior Compartment of Arm:

1. Triceps Brachii (Radial N)
 - a. Elbow extension
 - b. Shoulder extension

Anterior Compartment of Forearm (Superficial):

1. Pronator Teres (Median N)
 - a. Forearm pronation
 - b. Elbow flexion
2. Flexor Carpi Radialis (Median N)
 - a. Wrist flexion
 - b. Wrist abduction
3. Palmaris Longus (Median N)
 - a. Wrist flexion
4. Flexor Carpi Ulnaris (Ulnar N)
 - a. Wrist flexion
 - b. Wrist adduction

Anterior Compartment of Forearm (Intermediate):

5. Flexor Digitorum Superficialis (Median N)
 - a. Fingers flexion

Anterior Compartment of Forearm (Deep):

6. Flexor Digitorum Profundus (Median + Ulnar N)
 - a. Fingers flexion
7. Flexor Pollicis Longus (Median N)
 - a. Thumb flexion
8. Pronator Quadratus (Median N)
 - a. Forearm pronation

Muscles of Lower limb

Anterior Compartment of Thigh

1. Pectineus (Femoral N)
 - a. Hip flexion
2. Psoas Major (Lumbar N)
 - a. Hip flexion
3. Iliacus (Femoral N)
 - a. Hip flexion
4. Sartorius (Femoral N)
 - a. Hip and knee flexion
 - b. Hip abduction and lateral rotation
5. Tensor Fascia Lata (Femoral + Gluteal N)
 - a. Hip abduction
 - b. Knee extension
6. Quadriceps Femoris
 - I. Rectus Femoris
 - II. Vastus Lateralis
 - III. Vastus Intermedius
 - IV. Vastus Medialis

Posterior Compartment of Thigh (Hamstring Muscles)

1. Biceps Femoris
 - a. Knee flexion and lateral rotation
 - b. Hip extension
2. Semitendinosus
 - a. Knee flexion and medial rotation
 - b. Hip extension
3. Semimembranosus
 - a. Knee flexion and medial rotation
 - b. Hip extension

Medial Compartment of Thigh

1. Adductor longus
 - a. Hip adduction
2. Adductor Brevis
 - a. Hip adduction
3. Adductor Magnus
 - a. Hip adduction and medial rotation
 - b. Hip flexion and adduction
4. Pectineus (Femoral + Obturator N)
 - a. Hip flexion and adduction
5. Gracilis
 - a. Hip flexion and medial rotation

Posterior Compartment of Forearm (Superficial):

1. Brachioradialis (Radial N)
 - a. Elbow flexion
 - b. Forearm supination and pronation
2. Anconeus (Radial N)
 - a. Elbow extension
3. Extensor Carpi Radialis Longus (Radial N)
 - a. Wrist extension
 - b. Wrist abduction
4. Extensor Carpi Radialis Brevis (Radial N)
 - a. Wrist extension
 - b. Wrist abduction
5. Extensor Digitorum (Radial N)
 - a. Wrist and fingers extension
6. Extensor Digiti Minimi (Radial N)
 - a. Wrist extension
 - b. Little fingers extension
7. Extensor Carpi Ulnaris (Radial N)
 - a. Wrist extension
 - b. Wrist adduction

Posterior Compartment of Forearm (Deep):

8. Supinator (Radial N)
 - a. Forearm supination
9. Abductor Pollicis Longus (Radial N)
 - a. Thumb abduction
10. Extensor Pollicis Brevis (Radial N)
 - a. Thumb extension
11. Extensor Pollicis Longus (Radial N)
 - a. Thumb extension
12. Extensor indicis (Radial N)
 - a. Wrist extension
 - b. Index finger extension

Anterior Compartment of Leg

1. Tibialis anterior
 - a. Ankle dorsiflexion
 - b. Foot inversion
2. Extensor Digitorum Longus
 - a. Ankle dorsiflexion
 - b. Foot eversion
3. Peroneus Tertius
 - a. Foot eversion
4. Extensor Hallucis Longus
 - a. Big toe extension
 - b. Ankle dorsiflexion
 - c. Foot inversion

Lateral Compartment of Leg

1. Peroneus Longus
 - a. Foot eversion
2. Peroneus Brevis
 - a. Ankle plantarflexion
 - b. Foot eversion

Posterior Compartment of Leg (Superficial)

1. Plantaris
 - a. Ankle plantarflexion
2. Triceps Surae Muscles
 - a. Gastrocnemius
 - b. Soleus

Posterior Compartment of Leg (Deep)

1. Popliteus
 - a. Knee flexion
2. Flexor Digitorum Longus
 - a. Medial rotation of foot
 - b. Lateral foot flexion
 - c. Ankle plantarflexion
3. Flexor Hallucis Longus
 - a. Big toe flexion
 - b. Ankle plantarflexion
4. Tibialis Posterior
 - a. Foot inversion

Hand (Thenar Muscles):

1. Flexor Pollicis Brevis (Median N)
 - a. Thumb flexion
2. Abductor Pollicis Brevis (Median N)
 - a. Thumb abduction
3. Opponens Pollicis (Median N)
 - a. Thumb opposition
4. Adductor Pollicis (Ulnar N)
 - a. Thumb adduction

Hand (Hypothenar Muscles):

5. Flexor Digiti Minimi (Ulnar N)
 - a. Little finger flexion
6. Abductor Digiti Minimi (Ulnar N)
 - a. Little finger abduction
7. Opponens Digiti Minimi (Ulnar N)
 - a. Little finger opposition

Hand (Others):

8. Four lumbricals muscle (Ulnar + Median N)
 - a. Metacarpophalangeal joint flexion
 - b. Interphalangeal joint extension
9. Four or three Palmar Interossei Muscles (Median N)
 - a. Fingers adduction
 - b. Metacarpophalangeal joint flexion
 - c. Interphalangeal joint extension
10. Four Dorsal Interossei Muscles (Median N)
 - a. Fingers abduction
 - b. Metacarpophalangeal joint flexion
 - c. Interphalangeal joint extension
11. Palmaris Brevis (Ulnar N)
 - a. Improving grip

Foot (Dorsal):

1. Extensor Digitorum Brevis (Deep Peroneal N)
 - a. Lateral four toes extension
2. Extensor Hallucis Brevis (Deep Peroneal N)
 - a. Big toe extension

Foot (Plantar- 1st Layer):

1. Abductor Hallucis (Medial Plantar N)
 - a. Big toe abduction
2. Flexor Digitorum Brevis (Medial Plantar N)
 - a. Lateral four toes flexion
3. Abductor Digiti Minimi (Lateral Plantar N)
 - a. 5th toe flexion and abduction

Foot (Plantar- 2nd Layer):

4. Quadratus Plantae (Lateral Plantar N)
 - a. Distal interphalangeal joints flexion
5. Four Lumbricals (Lateral Plantar + Medial Plantar N)
 - a. Metatarsophalangeal joint flexion
 - b. Interphalangeal joint extension

Foot (Plantar- 3rd Layer):

6. Flexor Hallucis Brevis (Medial Plantar N)
 - a. Big toe flexion
7. Adductor Hallucis (Lateral Plantar N)
 - a. Big toe extension
8. Flexor Digiti Minimi Brevis (Lateral Plantar N)
 - a. 5th toe flexion and adduction

Foot (Plantar- 4th Layer):

9. Three Plantar Interossei (Lateral Plantar N)
 - a. Toes adduction
10. Four Dorsal Interossei (Lateral Plantar N)
 - a. Toes abduction

Composition Process of *Hand Song*



Anatomy: Hand (muscles)

Hand (Thenar Muscles):

- Flexor Pollicis Brevis (Median N)
 - Thumb flexion
- Abductor Pollicis Brevis (Median N)
 - Thumb abduction
- Opponens Pollicis (Median N)
 - Thumb opposition
- Adductor Pollicis (Ulnar N)
 - Thumb adduction

Hand (Hypothenar Muscles):

- Flexor Digiti Minimi Brevis (Ulnar N)
 - Little finger flexion
- Abductor Digiti Minimi (Ulnar N)
 - Little finger abduction
- Opponens Digiti Minimi (Ulnar N)
 - Little finger opposition

Hand (Others):

- Four lumbricals muscle (Ulnar + Median N)
 - Metacarpophalangeal joint flexion
 - Interphalangeal joint extension
- Four or three Palmar Interosei Muscles (Median N)
 - Fingers adduction
 - Metacarpophalangeal joint flexion
 - Interphalangeal joint extension
- Four Dorsal Interosei Muscles (Median N)
 - Fingers abduction
 - Metacarpophalangeal joint flexion
 - Interphalangeal joint extension
- Palmaris Brevis (Ulnar N)
 - Improving grip

Hand Song (Lyrics)

This is our hand

Hand muscles consist of three intrinsic muscles

**Thenar
Hypothenar
and Others**

Thenar muscles for thumb flexion, thumb abduction, thumb opposition, and thumb adduction

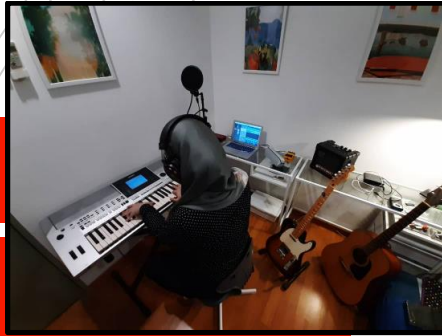
Hypothenar muscles for little finger flexion, little finger abduction, and little finger opposition.

Other 3 muscles of the hand are

Lumbricals muscles for MCP joint flexion, IP joint extension

Interosei muscles Palmar and Dorsal for finger movements

Palmaris Brevis improving handgrip



■ Innovative teaching module for anatomy:

- ✓ A “MUSICATANOMY ALBUM” of anatomy-learning music videos. (copyright)
- ✓ Development of a teaching tool that can be commercialised and patented and duplicated for other potential curriculum/syllabuses.

Commercialization Potential & Outcome

- File for **copyright and Intellectual Property IP (Musicanatomy music album)**
- Develop new updated anatomy **learning method (immersive learning)**
- Implementation into **medical curriculum**



Progress

- On to next stage of music video development (with choreographed movements)
- Implementation of 'new teaching module'



TERIMA KASIH / THANK YOU

