October 21, 2024

Logbook!

Create a kickboard that is able to sustain some water so that it is just below the surface.

Sub questions:

- What is a kickboard?
- What are kickboards made out of?
- What is the problem?
- How are kickboards used in training?
- What is buoyancy?
- Where is the center of gravity?

Hypothesis:

I think that I will be able to create a design that can sustain some water allowing a swimmers body to be level when kicking. I feel this because based on previous resea

I have already confirm

Question:

How do adjustments to the Density and Design of a kickboard impact a swimmer's experience?

November 4, 2024

estions # 2:

is a kickboard?

t are kickboards made out of?

t is the issue/problem?

re kickboards used in training?

is buoyancy?

s your center of gravity when using board?

are the biomacanics to a good kick?

e the biomacanics when using a board?

n different types of strokes

way the kickboard is used?

did I use buoyancy to create

created the 1st kickboard

November 4, 2024

Plan:

1. Gather all materials by Nov 20, 2024
2. Contact swim coach to shedule an interview by Nov 25, 2024
3. Interview swim coach by Nov 30 or before Dec 3, 2024
4. Contact Physiotherapist for interview by December 12, 2024
5. Interview Physiotherapist by Dec 17 or Jan 5.
6. Finish all research by Dec 25, 2024
7. Start creating model by Jan 1, 2024
8. Create flashcards with whole presentation on them by Jan 3, 2024

3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20 Rough draft plan due	21	22	23
24	25	26	27	28	29	30

December 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16 Send questions to physiotherapist	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

5	6 Ask swim coach to interview	7 Interview Swim Coach	8	9	10 Finish Model #1	11
12	13	14	15 Finish Model #2	16	17	18
19	20	21	22	23 Finish Model #3	24	25
26	27	28	29 Rough draft project plan due	30	31	

February 2025

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12 Science Fair!	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

November 5, 2024

kickboard?

foam boards

g muscels to focus on

th uninterrupted breathing

use

ower comes legs

te a cardiovascular workout –

eart & lungs working hard

The issue?

shoulders

s in front of you it can

ren

ain

ips go down your neck

nd it hurts (craning head)

technique

n fast you have to roll = using

roll - flat hips

November 14, 2024

What are kickboards made out of?

- Plastic, foam, EVA foam, wood
- Started off with wood and

How are kickboards used in training?

- To help with focusing on lower body kick and helps with endurance
- When using board you have to engage your core, grip the top with your hands
- kick from hips not knees

What is buoyancy?

- When an object is in water and the water creates an upward force that counteracts the weight = lifts it up
- Buoyancy = if the object floats or sinks
- Archimedes (greek mathmatician discovered it)
- Archimedes principle = when an object is immersed in a fluid, partially or wholly, it displaces the fluid. The weight lost by the object is equal to the weight of an equal volume of displaced fluid.

November 14, 2024

ur center of gravity when
ckboard?

elvis area
the biomechanics to han
k and?

m Hips NOT knees
t e together
sed:
ceps - in front of thigh
ings - back of thigh
- lower leg (below knee)
- buttock muscles - gluteus
gluteus medius - gluteus minimus
the biomechanics to he using

oard with butterfly
sink
> better to grab back of board
ater - do not hold top

November 19, 2024

- kick in streamlined position.

Who Created the First Kick-board?

- Adolf Kelfer in the 1930's
  - L> he was an olympic gold medalist for swimming.
- U.S. government for H2O training of the army.
- Designed for kick strength
- He started a company for them.

- By Fran
roll technique?
applicable to all
?
the biomechanics
king your legs
ming?

December 18, 2024

Questions for Physiotherapist!

1. When using a kickboard, which muscles in the human body are being used?
2. Are these muscles the same without a kickboard?
3. What bones are attached to those muscles being used?
4. How does the motions of the feet/ankle impact kicking?
5. What are the biomechanics of the human body when using a kickboard?
6. What would this look like without the kickboard?
7. Where is the centre of gravity when you are kicking when swimming?

December 18, 2024

onse from Physiotherapist

ing flutter kick:

rgely your glutes (Maximus & lute minimus & glute medius), hip flexors, or quadriceps (keeps rt) & plantar flexors (gastrocnemius pointed).

rearm flexors if holding the board, ne latissimus Dorsi as you'd me downward pressure on the er to keep your body/head up, ractors (rhomboids, lower traps) your shoulder blades from hunching will be working but your s will be working a bit more is more extended than when not board & a swimmer will have to gage their abdominal wall (transverse s abdominus, obliques, etc) or they may kind of sag

#2: You would not have the arm activity, no downward pressure from the lats. Spine & head position would not be extended so less spinal extension without the board. There might be more spine & hipe rotation without the board.

#3:

Glutes attach to your pelvis & femurs, latissimus dorsi attaches humerus to thoracolumbar fascia / thoracic spine / ribs, Scapula retractors (scapula to spine) quads (femur/pelvis to patellar tendon which attaches to tibia) Core: attaches ribs, abdomen spine

#4:

If your feet are too dorsiflexed (90 degrees to your lower leg) in flutter kick you get less propulsion than if you plantarflex them (point them).

e hands soft feet probably
e water than muscle ling
vater.

the increased spinal
& less rotation with the
lier.

eamlined as you'd have
through spine so hips
higher (think body
hout board) & maybe
rotation as you're not
g off the board.

how to answer.

January 5, 2025

Hypothesis for model 1:

Smaller kickboards are less buoyant and work a swimmer's core more than the bigger models. This means that if a model is created that is less buoyant (is able to sustain some water) it will help improve kickboards.

Model 1 Building Procedure:

1. With 2 cardboard pieces cut them into 17 inch in length & 12 inch is width.
2. Glue both cardboard pieces together with hot glue.
3. Glue styrofoam & pieces of cardboard together.
4. Tape kickboard horizontally.
5. Tape kickboard vertically.
6. Tape plastic band onto the side of kickboard (make sure to have it with kickboard inside).

January 14, 2025

d, Controlled, & Responding

: The materials.

My testing process.

The preformance of the kickboard

January 14, 2025

Questions For Swim Coach:

1. What would you say is the best stroke kick to do when you're using a kickboard? And why?
2. Where is your center of gravity when kicking?
3. What are the positives & negatives of using a kickboard?
4. In your opinion, what are the best models of a kickboard used today?
5. How long should the kickboard be?

January 14, 2025

e From Coach!

k it's breaststroke, because
ractise their breathing when
d the timing of that breath
ong with the kick. But it's also
. I think fly kick is really important
establishes your core.
probably your core, because if
out it, if you tip your kickboard
n & you put your weight on it it'll
go back your legs come back so
r core.
positives: you get to work on
the negatives of using a kickboard
u push down on the kickboard it
ulders, I can remember that as a
can also sometimes teach you the
if your coach doesn't catch that
breaststroke. But as a coach I don't
many negatives.

January 14, 2025

#4: I used an arena one as a kid, but you know that I don't like the ones with the handles because you don't stretch your full arm. But honestly the more thin ones, you know the ones that are less buoyant can be bad because your arms are sinking it so probably a middle one between really floaty and not so much.

#5: For my kickboard I found it easier for my shoulders because I had a smaller one, it came down to about my elbows.

January 20, 2025

for Model 2:

ickboard is more dense than
the water it will sink. However
l is more dense than the current
kickboard and still buoyant
a swimmer's body level. With
ble compartment it will be
or different swimmer's weight

is for Model 3:

es on the back of the E.V.A
ate a downward force and
the buoyant force, making the
ble to sustain some water.

January 20, 2025

Model 2 Building Procedure:

1. Cut out one piece of E.V.A foam 14 inches in length & 10 inches in width.
2. Cut out a second piece of E.V.A. foam the same length & width, with a square piece cut out 5 inches in width & 5 inches it length.
3. Cut out a third identical piece to the first piece of E.V.A foam.
4. Glue all three pieces together with the second piece in the middle, with hot glue.
5. Cut out one more identical piece of E.V.A foam as the first and hot glue it on top of the third piece.
6. Hot glue a plastic band on the back of the kickboard, with the kickboard in the middle.

January 20,2025

ibbing Procedure:

e piece of E.V.A foam 12inches
10inches in width.
ree more identical pieces the
length and width.
four pieces together with hot

sponge on the back of the
ne sponge should be horizontal
hot glue.
er sponge below it positioned
. Glue it with hot glue.

January 27,2025

Testing process:

1. See if it floats.
2. Put one hand on it.
3. Put forearm on it.
4. Put both forearms on it.
5. Kick with kickboard.

Outcome:

Model 1: Floats, and sustains some water (swimmer's body is level).
Mode 2: Floats, ajustable compartment works, is too buoyant.
Model 3: Floats, is too buoyant and is very tall.

January 27, 2025

on:

as the best model because
to sustain some water & the
dels were too buoyant which
s. The cardboard & styrofoam
the right density & the tape
ucceeded in protecting the
from getting wet. Some
break through the tape,
ped create the downward
swimmer's usually have to
h their shoulders. My
was proven correct.

January 27, 2025

Analysis:

The length & depth of model 1 created a perfect balance between buoyancy & the water. The tape around the kickboard kept it dry, however one piece leaked although this helped make a downward force allowing a swimmer's body to be level in all forms of kicking.