Pliability

I) What is Pliability?

Definition: easily bent; flexible

- Synonyms: elastic, supple, workable, springy
- Root words: Plier (FR): to bend; ability: capacity to do something

II) Limber Muscles

When do injuries happen in sports?

- When the force-load of **exertion** (internal force) **or stress** (external force) is greater than the force-load that a muscle can respond to
    - Results in cramping, pulled muscles, or tears

Why does pliability help?

- A **pliable** muscle is one that is both elongated but responsive (ie is its **limber**)
    - As athletes age, strength increases but pliability stays the same or decreases
    - Athletes must maintain their pliability so that the muscles can perform at maximal force without damaging themselves

III) Pliable vs Stretched

What is the difference between being pliable & being stretched?

Think about a pizza dough: it will start out small, but it will need to expand and hold its strength in order for it to become a full-size pizza. If you try to stretch it right away, it will tear. But, if you work at it by gradually rolling it, stretching it, and warming it up, it will expand without tearing.

How does this apply to muscles?

1) As muscles increase in mass as a response to exercise, they naturally begin to tighten
    a) To combat this tightness, an athlete must work on their **mobility** (ie range of motion)
        i) To have a broad range of motion, muscles need to be:
            (1) Flexible
            (2) Able to fully expand & contract
        ii) These two things constitute **pliability**

Being stretched is not enough to perform exercise well!

- Few people can dive into a race & hit 100% performance off of stretching alone; even fewer can do multiple races at 100% performance this way
- Pliability requires muscles to be **long**, **warmed**, & **elastic**

IV) Developing Pliability

Pliability comes gradually over time, and must be worked on every day. Here is how you can do so:

Pre Workout:

1) Hydration
    a) The human body is largely composed of water

b) Dehydrated muscles will be sluggish, unresponsive, and unnaturally tight
    i) Won't receive stress to full capacity & will have decreased ROM, thus leading to increased stress on the connective tissue

2) Foam Rolling
    a) Elongates a muscle by repeatedly targeting a muscle group or area with low, travelling stress
    b) Expands the tissue

3) Dynamic Bodyweight Exercises
    a) Warm the muscles by increasing heart rate
    b) Expansion & contraction move blood throughout muscle tissue, supplying all layers of that tissue with nutrients & oxygen
    c) Simple movements will prepare the body on a **neural level** for the more advanced movements that will follow

4) Stretching
    a) Following Foam Rolling & Dynamic Bodyweight Exercises, stretching will help muscles reach their peak expansion in following exercise

Post Workout:

1) Hydration
    a) Helps keep blood fluid & helps deliver post-workout recovery nutrients
    b) Helps body process post-workout metabolites that must be excreted

2) Foam Rolling
    a) Massages muscular tissue, helping to prevent cramps & knots
    b) Works post-workout metabolites into bloodstream
    c) Fluidly & rhythmically relaxes the muscle after bouts of intense & extensive contractions

3) Dynamic Bodyweight Exercises
    a) "Cooldown on Land"; help to train muscles to perform under duress in normal gravity
    b) Helps maintain ROM in an exhausted state

4) Stretching
    a) Works out any tight areas that might require a more extensive hold