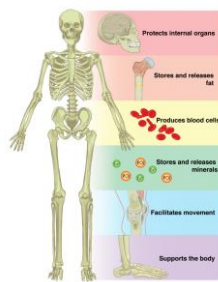




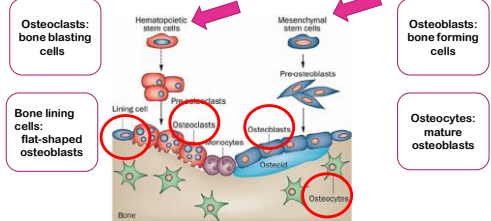
Developing Perfect Bone Building Exercises

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GARAGE GIRLS FITNESS

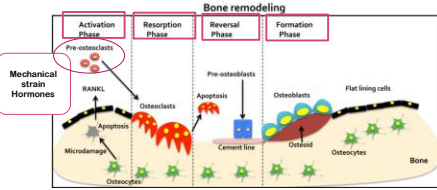
Bone Physiology



Bone Physiology



Bone Remodeling Process



Optimal Bone Environment

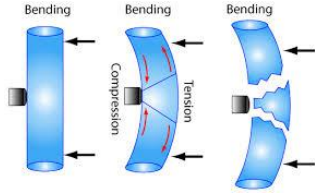
- Nutrition
- Hormonal Environment
- Exercise

Wolff's Law

Bones will adapt based on the stress or demands placed on them

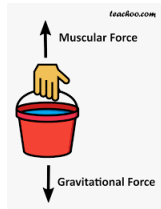


Minimal Essential Strain



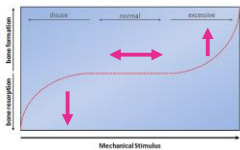
Components of Bone Building Exercises

- Strain Magnitude
- Strain Rate
- Strain Cycle/Frequency
- Strain Distribution
- Rest



Strain Magnitude

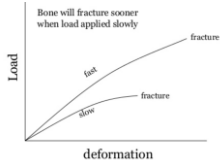
The amount of relative change in bone length under mechanical loading



Strain Rate

10

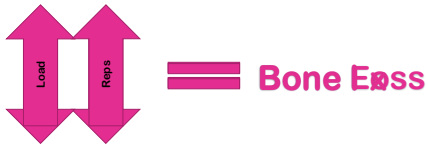
The rate at which strain develops and releases



Strain Cycle/Frequency

11

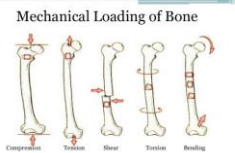
The number of repetitions that change the bone dimensions at any given magnitude



Strain Distribution

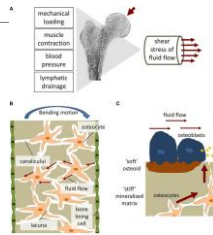
12

The way the strain is distributed across a section of bone



Rest

13



Putting It All Together

14

The most osteogenic exercise activities appear to be those that have high-strain magnitudes and/or high-strain rates

Short bouts of activity interspersed with recovery are preferable to long duration loading

Aerobic Training

15

Weight bearing aerobic training activities - with high intensity and speed- are able to help maintain and improve bone mineral density.



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Non-Weight Bearing Aerobic Training

Strain Magnitude: Minimal

Strain Rate: Minimal

Strain Cycle/Frequency: Continuous or interval

Strain Distribution: Cycling, elliptical one plane swimming – can be multiplanar





17

Weight Bearing Aerobic Training

Strain Magnitude: Varies with mode

Strain Rate: Varies with mode

Strain Cycle/Frequency: Continuous or interval

Strain Distribution: Varies with mode



18

Walking

Walking has been found to be ineffective for enhancing BMD in **non sedentary** post menopausal women



Impact Exercises

19

Hip Hop study: 50 daily multi directional hops = bone density ↓

- Strain Magnitude: BW +
- Strain Rate: Quick!
- Strain Cycle/Frequency: ✓
- Strain Distribution: Multi directional

Drop Step Exercise

20

- Strain Magnitude: Body weight
 - Step height
 - Weighted vest
- Strain Rate: Quick drop
- Strain Frequency: no more than 40!
 - Load increase, reps decrease
 - Break up into sets
- Strain Distribution: Foot placement

Push Ups / Fall Downs

21

- Strain Magnitude: Body weight
 - Wall, floor
 - Double, single arm
 - Weighted vest
- Strain Rate: Quick drop
- Strain Frequency: no more than 40!
 - Load increase, reps decrease
 - Break up into sets with rest
- Strain Distribution: Hand placement

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Resistance Training

- Strain Magnitude: YES!!!!
- Strain Rate: YES!!!!
- Strain Frequency: YES!!!!
- Strain Distribution: YES!!!!



23

Vibration Training

- Strain Magnitude: Low
- Strain Rate: Quick!
- Strain Cycle/Frequency: High
- Strain Distribution: Multi directional



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Contraindications



Final Thoughts

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Questions

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