Clinical Trial ID:

NCT00000405

Title:

Effects of Jumping on Growing Bones

Summary:

In this study we will investigate the effects of a high-impact exercise program involving jumping on bone mass (the amount of bone) of the hip and backbone in the growing skeleton. We will also look at the effects of gradually stopping the jumping program on bone mass in the growing skeleton. A high-impact exercise program may build more bone during childhood, while the skeleton is still growing. This may help prevent broken bones due to loss of bone mass later in life.

We will recruit 200 children aged 5-10 to participate in the study. For 6 months we will train the children in either a jumping or stretching program. We will then gradually reduce the amount of exercise over 6 months. We will measure bone mass in the hip and backbone at the start of the study, after jumping, and 6 months after the jumping program

is stopped. We will compare the results in the jumping and stretching groups.

Detailed Description:

Osteoporotic fractures are increasing at an alarming rate in this country and result in over 13 billion dollars in health costs annually. Peak bone mass, that is, an individual's maximum bone mass at the completion of skeletal acquisition, is an important determinant of fracture risk. Thus, maximizing peak bone mass may provide an effective strategy for preventing osteopenia and osteoporosis.

Various investigators have postulated that increasing bone mass by 3-5 percent would reduce fracture risk by 20-30 percent. Our data in collegiate female gymnasts demonstrate hip and spine bone mineral density values of up to 40 percent above values in normal age-matched controls and elite runners, despite menstrual irregularities. Further, we have observed the dynamic response of bone to high-impact forces in gymnasts over the training season as bone increases of 2-5 percent.

This is a randomized, controlled exercise intervention designed to evaluate the effect of high-impact loading as a means to increase bone mass during development. It

will

determine bone mass accrual and bone geometry at the lumbar spine and proximal femur in

prepubescent girls and boys. Further, this study will evaluate the bone response from

withdrawal of the stimulus over 6 months.

We will recruit 200 pre-pubescent children during two separate years and randomly assign

them to a jumping or a stretching group. The jumping group will perform double leg jumps

and the stretching group will act as a control. Outcome variables include bone mineral

density (BMD) at the spine and hip, estimated bone volumetric density at the spine, and

cross-sectional geometry of the femoral neck and diaphysis.

Implementing a specific bone-loading program during childhood will potentially allow the

bone to increase both its mass and mineralization at an earlier age and therefore provide

a larger foundation of mineralization for further growth throughout adolescence until

skeletal maturity is reached. We expect our findings to provide a basis for the design of

strategies to build bone during growth and thereby reduce osteoporotic

fractures.

Eligibility Criteria:

Inclusion Criteria:

- **Apparently healthy boys and girls**

- **BMI < 30kg/m2**

Exclusion Criteria:

- **BMI < 30kg/m2**

- **Orthopedic problems that would limit physical participation**

- **Metabolic diseases that would influence bone metabolism**

Gender:

All

Minimum Age:

5 Years

Maximum Age:

10 Years

Phase:

Phase 2

Conditions:

- Osteoporosis

Interventions:

- Exercise intervention

Locations:

- Oregon State University, Corvallis, Oregon