University of Pittsburgh
School of Health and Rehabilitation Sciences
Department of Sports Medicine and Nutrition
Neuromuscular Research Laboratory

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CONSENT TO ACT AS A SUBJECT IN A RESEARCH STUDY -LAB and CONTROL SUBJECTS

TITLE: Optimizing Muscle and Bone Mechanoadaptation to Physical Training: Mechanistic Control Paths via Muscle and Bone Crosstalk to Altered Mechanical Loading

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SOURCE OF SUPPORT:
U.S. Army Medical Research and Development Command (USAMRDC)

Key Information

You are being asked to take part in a research study. This study will include only people who choose to take part. The study team members will explain the study to you and will answer any questions you might have. You should take your time to make your decision.
The goal of this study is to gain a better understanding of how exercise affects bone to try to reduce injuries in the military. To do so we will examine bone images, blood samples and measurements of bone fatty tissue. These measurements will occur before, halfway through and after a 24-week period. During this 24-week period, half of the participants will complete supervised exercise training three times per week, and the other half of participants will maintain their normal physical activity. If you decide to participate in the study, you will be randomly assigned to one of these two groups. All participants complete the same testing visits, including:

- 3 Testing Visits Before the 24 Week Period
- 1 Testing Visit After 12 Weeks
- 3 Testing Visits After the 24 Week Period

If you decide to participate in this study, you will be asked to complete the following testing procedures:

- Hydration Assessment – You will provide a urine sample from which we will determine your current hydration status.
- HR-pQCT Bone Imaging – The HR-pQCT collects very detailed images at two locations in your lower leg and allows us to measure bone density, shape and strength
- DXA Imaging – The DXA allows us to measure bone density throughout your entire body. The DXA also allows us to measure your body composition (the amount of lean and fatty tissue in your body)
- 3D Body Scanner – The 3D body scanner will be used to evaluate changes in body size across the study
- Blood Draws – We will examine how exercise alters the levels of different factors in the blood which can influence bone growth. There are a total of 5 blood draws across the entire study.
- Urine Samples – At various points throughout the 24-week period, we will ask you to provide a urine sample so that we can measure estrogen levels
- Exercise Performance Tests – We will determine the maximum amount of weight that you can leg press. You will be asked to complete an Acute Exercise Test in which you will perform 10 sets of 10 weighted jumps at 40% of the maximum leg press weight, an isometric midthigh pull (IMPT), and a countermovement jump. The exercise test details are described in the visit descriptions.
- MR Spectroscopy (MRS) – MRS allows us to measure the amount of fatty tissue in the bones of your lower leg and spine.
- Questionnaires: You will be asked to complete several questionnaires which determine:
    - Calcium intake from your diet

- Your health history
- Menstrual history and contraceptive use (Female participants only)
- Caloric intake

Risks and side effects related to the exercise training program and associated tests include those which are:

- ***Likely:*** Heavy breathing, dizziness, muscle fatigue, headache, muscle soreness of the leg muscles and overall fatigue during or following performance, load, and intense training, bruising, redness, or swelling of the vein during or following blood draw, localized skin warming during MRS and exposure to small amounts of radiation (similar to an x-ray) during HR-pQCT and DXA scans.
- ***Less Likely:*** Infection or fainting during or following blood draws, claustrophobia during MRS, abnormal response to performance exercise testing.
- ***Rare but serious:*** Breach of confidentiality following the collection of private health information, questionnaires, and biospecimens

For completing this study, you will receive a total of $1,000. If you are assigned to the training group, you will receive 24 weeks of free personal training. Lastly, the results from this study will help us better understand how exercise affects bone. Such information could help reduce bone injuries in the military.

Why is this research being done?

Stress fractures are among the most common muscle and bone injuries suffered by military personnel, particularly in new recruits. Approximately 5% and 21% of male and female recruits will suffer a stress fracture, respectively. Training programs must be developed that prevent these injuries to prepare military personnel for the demands of military service. At the current time, military leadership has identified critical gaps in understanding how to structure exercise training to train soldiers and prevent muscle and bone injuries.

The goal of this study is to gain a better understanding of how bone adapts to various exercise programs which differ based on the frequency and intensity of bone loading. Bone loading refers to the stress on bones that results from weight-bearing activities such as exercise with weights or when you support the weight of your body, like running or jumping. We will measure how your bones change with state-of-the-science bone imaging technology. This technology allows us to see small, but important changes.

Additionally, we want to find out other ways the human body changes in response to exercise. We will look at things like changes in hormone level, chemicals released from active skeletal muscles, and your body composition. The results from this study will be used to improve physical readiness training in the military with the goal of reducing injuries.

Who is being asked to participate in the research study?
Healthy adults, between the ages of 18-40, who are physically active (at least 150 minutes of moderate intensity physical activity per week). We will compare data from 96 healthy adults to data from 88 ROTC cadets.

What procedures will be performed for research purposes?
If you decide to take part in this research study, you will undergo the following procedures that are not part of your standard medical care:

Study Overview
Participation in the study requires 7 total testing visits:

1. 3 pre-intervention,
2. 1 mid- intervention
3. 3 post-intervention.

We aim to complete the 3 pre-intervention visits within 1-2 weeks. After the third pre-intervention visit is complete, you will enter the 24- week intervention period, which will consist of either 24 weeks of supervised lower-body resistance training or 24 weeks of maintaining your current physical activity level, depending on your group assignment. The mid-intervention testing visit will occur halfway through the intervention period, at the end of week 12. After the 24-week intervention period is complete, you will complete the final 3 testing visits, similar to pre-training testing visits 1, 2 and 3.

All non-ROTC individuals that enroll in the study will be assigned at random to either the resistance training group or the current physical activity control group. The study team has no advance knowledge of who will be assigned to each group. For every 4 people randomly assigned to the resistance training group, 1 person will be assigned to the current physical activity control group. Group assignments will be completed separately for each sex.

The details of each testing visit are as follows:

Visit 1 (Pre-intervention): This visit will occur at the Neuromuscular Research Laboratory (NMRL) and lasts approximately ~1.5 hours. You will complete the informed consent process, complete a medical assessment that involves a Physical Activity Readiness Questionnaire (PAR-Q), be familiarized with the Plyo-Press Machine and the IMTP test and determine a leg press one repetition maximum (1 RM). You will then perform a counter movement jump test where you jump as high and as fast as possible, landing with both feet on a force plate.

Visit 2 (Pre-intervention): This visit occurs at Neuromuscular Research Laboratory (NMRL) and lasts approximately ~2.5 hours. At this visit, we will collect a urine sample and whole body, AP spine, and unilateral hip DXA scans, HR-pQCT scans of the lower outer leg, and a 3D body scan. Additionally, blood draws will be taken at rest and immediately following an Acute Exercise Test consisting of a warmup, an IMTP test, and 10 sets of 10 repetitions on the Plyo-Press Machine. You will also complete health history and dietary calcium intake questionnaires. At this visit you will also be randomly assigned to either the training group or the control group.

Visit 3 (Pre-Intervention): This visit will occur at the MR Research Center (MRRC) at Presbyterian University Hospital and requires ~1 hour. At this visit, you will receive MRS scans

of your back and leg. This visit will be scheduled by the study's program manager based on your availability and the availability of the MRRC.

Visit 4 (Mid-Intervention): This visit will occur at the NMRL around the 12th week (midpoint mark) of the intervention and will take ~1.5 hours. At this visit, we will collect a urine sample, a whole body, AP spine and unilateral hip DXA scan, HR-pQCT scans of the distal tibia, a 3D body scan and a resting blood draw. You will perform a counter movement jump and an IMTP test and determine a leg press one repetition maximum (1 RM) and complete questionnaires.

Visit 5 (Post-Intervention): This visit occurs at Neuromuscular Research Laboratory (NMRL) and lasts approximately ~1.5 hours. This visit will be similar to visit 1..

Visit 6 (Post-Intervention): This visit occurs at the Neuromuscular Research Laboratory and will last approximately 2.5 hours. This visit will be similar to visit 2.

Visit 7 (Post-Intervention): This visit will occur at the MR Research Center (MRRC) at Presbyterian University Hospital and requires ~1 hour. This visit will be identical to visit 3. This visit will be scheduled by the study's program manager based on your availability and the availability of the MRRC.

For all testing sessions, you will be instructed to wear athletic clothing (t-shirts, shorts, and athletic shoes). You will be given a reminder (call, email, or text) prior to each testing day to remind you of your appointment and any restrictions for the visit (physical activity limitations, fasting requirements, etc.).

Locations

All testing and training sessions will take place at the locations listed below:
Neuromuscular Research Laboratory (NMRL): 3860 South Water Street in the South Side neighborhood of Pittsburgh
MR Research Center: Presbyterian University Hospital, 8th Floor, 200 Lothrop St. in the Oakland neighborhood of Pittsburgh

Training Locations
University of Pittsburgh Dept of Sports Medicine and Nutrition NMRL
3859 South Water Street
Pittsburgh PA 15203

University of Pittsburgh
Fitzgerald Field House
3526 Allequippa St, Pittsburgh, PA 15219

University of Pittsburgh
Cost Sports Center
350 Robinson St, Pittsburgh, PA 15261

Testing Procedures

Medical Assessment (5 minutes): You will be asked to complete a Physical Activity Readiness Questionnaire (PAR-Q) and other background questionnaires to determine your suitability to

undertake maximal exercise safely. Based on your responses to the PAR-Q, you may be required to have your physician give written permission to participate. Or, you may choose to have a study physician examine you to confirm you may be enrolled. Your resting blood pressure and pulse will be measured, and you will be asked about current and past medication and drug use. A wall mounted tape measure and an electronic scale will be used to measure your standing height and weight and calculate Body Mass Index (BMI). The length of your legs and arms will be measured with a tape measurer.

Leg Press 1RM (Visits, 1, 4 & 5 – 30 minutes): After being familiarized with the Plyo-Press Machine, we will determine your leg press-one repetition maximum ("1RM") - the maximal amount of weight you can leg press on the device. After a light warm up set, we will aim to determine your 1RM within 3-5 attempts. Changes in weight between attempts will be determined by your feedback and the expertise and experience of the certified strength and conditioning specialists supervising the assessment.

High-Resolution Peripheral Quantitative Computed Tomography (HR-pQCT)(Visits 2, 4 & 6 – 25 minutes): You will be seated in a chair, with your non-dominant foot immobilized, and placed in a removable cast boot to keep it from moving. You will be asked to keep your lower extremities as still as possible during the course of the scan, which will last approximately 3 minutes, per site and scan.

DXA Body Composition Assessment (Visits 2, 4 & 6 - 25 minutes): The breakdown of your body composition (fat, muscle, and bone mineral density) will be measured with a system that utilizes dual-energy x-ray absorptiometry (DXA). You will be required to wear clothing without any metal components such as zippers or buttons (athletic clothing) and must lay still on a flat table with minimal movement and normal breathing for approximately 20 minutes. During this time, a small mechanical arm will pass over your body, beginning over your head and moving towards your feet, taking images of the bone, tissue, and fat.

3D Body Scanner (Visits 2, 4 & 6 – 5 minutes) Wearing form-fitting clothing, you will be asked to stand on a platform with your arms straight, relaxed, and away from the body. Body size and length will be measured in under <1 minute.

Biomarkers blood draw (Visits 2, 4 & 6 – 15 minutes per draw) - You will be asked to relax your arm, palm side up, on an arm rest, as certified personnel collect samples in the crease of your arm. The amount of each blood draw is 40 mL, or 1/10 of a blood donation, < 3 tablespoons. The blood draw will be performed 2 times at visits 2 and 5, and 1 time at visit 4 (5 total needle sticks). The total for all visits in the study is 200 mL, about ¾ cup, or about 2/5 of the amount of a blood donation. A qualified researcher will draw your blood. We will analyze the blood for substances related to the communication between your muscles and bones. Your samples will be stored in a -80°C freezer in the NMRL until we analyze them. They will be de-identified and under the supervision of Dr. Nindl.

Acute Exercise Test (Visits 2 & 6 – ~30-40 minutes): You will be asked to complete 10 sets of 10 plyo-jumps at 40% of your leg press 1-RM. You will have 2 minutes of rest between each set. If you are not able to continue at the assigned weight, it will be lowered to ensure you complete 10 sets of 10 repetitions. Verbal encouragement and qualified spotters will be used to ensure both safety and completion of test.

Countermovement Jump (Visits 1 & 5 – ~5 minutes): You will perform a CMJ to a self- selected depth on a force platform. You will be instructed to "jump as high and as fast as possible, landing with both feet on the platform." During which, your hands will remain affixed to the hips. If at any point during the movement your hands are removed from the hips or if you fail to land back on the platform, the repetition will be repeated. Each repetition will be separated by approximately 2 minutes rest to ensure full recovery.

Isometric Midthigh Pull (Visit 2, 4 & 6 - ~ 10 Minutes): - You will perform an IMTP test. Additionally, you will be familiarized to this modality at visits 1 and 5. The IMTP is setup in a minimalistic squat style rack, with the barbell in a fixed position at your mid-thigh. You will then be instructed to grip onto the fixed barbell, maintaining an upright posture, to the pull up, while simultaneously pushing into the ground. You will complete 3 submaximal trials of the IMTP at 50, 75 and 90% of perceived maximal effort for a duration of 3 seconds. Two minutes of rest will be administered between trials to ensure full recovery.

Bone Marrow Adipose Tissue Imaging (Visits 3 & 7 – ~30 minutes): You will have a Magnetic Resonance Imaging/Magnetic Resonance Spectroscopy (MRI/MRS) scan performed. The MRI/MRS scanner is a large tube-shaped machine that takes pictures of different parts of the inside of your body. The MRI/MRS scanner uses a magnet to take these pictures, meaning that there is no radiation involved in this scan. Please let us know if you are claustrophobic or afraid of being in tight spaces before we perform this scan. The MRI/MRS machine can be very noisy, so we will give you ear plugs or earphones to wear to minimize the noise. You and the MRI/MRS technician will be able to communicate with each other the entire time you are in the scanner. If you experience discomfort or need to stop the scan at any time, you can let the technician know and he or she will stop the scan. In preparation for your MRI/MRS scan, please wear MRI safe clothing (clothing without metal). An MRI technician will review a safety questionnaire with you before the scan to be sure you do not have any unsafe metal on or in your body.

Urine Sample Collection: We will be analyzing sex hormone concentrations throughout the study via urine samples. Women will be asked to provide 2 samples per week throughout the study. Due to more stable sex hormone concentrations men will be asked to provide one sample per month. You will be provided with urine collection containers by the study team. You will be asked to collect the first void of the morning upon waking. The study team will coordinate a time for sample drop off.

Physical Activity and Diet Tracking: Throughout the study we will ask you to track your physical activity via weekly exercise logs that we will provide to you.
Additionally, we will ask you to track your diet throughout the study using a free, web-based tool known as the Automated Self-Administered Recall System. In the week prior to the intervention, we will ask you to record your dietary intake on two weekdays and one weekend day.
Throughout the study we will similarly ask you to track your dietary intake on two weekdays and one weekend day every 4th week.

Menstrual Cycle Tracking: Women will be provided a menstrual calendar to track their menstrual cycle throughout the duration of the study.

Wearable Technology: You will be issued a non-invasive wrist monitoring device (Garmin Forerunner 25 Activity Tracker) to use and wear for the duration of the study. You will receive instruction in the use of the Garmin. Each week, you will be asked to download data to track all outside activity. You will be contacted and asked a few questions about your exercise.

Hydration Assessment: Upon arriving at the NMRL you will provide a small urine sample. From this urine sample we will evaluate your current hydration status. If you are adequately hydrated you will move on to the other testing procedures. If you are dehydrated, you will be asked to drink water and your hydration will be reassessed. If you are adequately hydrated at the second assessment, you will move on to the other testing procedures. If you remain dehydrated, we will have to reschedule your testing visit.

Training Sessions if you are assigned to a training group
(72 sessions, ~ 60 minutes at the Neuromuscular Research Laboratory Training Facility)

Resistance training: You will be required to attend three 60 to 90-minute training sessions per week for 24 weeks. All sessions will be monitored an experienced study trainer who will provide feedback to continually improve your form and motivate you through tough workouts. During the training sessions, you will complete a standardized warm up and 4 to 6 resistance exercises. Training equipment used will vary from traditional barbells, dumbbells, kettlebells, medicine balls, resistance bands, weighted sleds, battle ropes, sandbags, and tires. Load intensities (weight used) will vary from the use of near maximal loads (heaviest you can lift) to lighter loads moved quickly, or for many repetitions. Training will also include several explosive exercises performed on the Plyo-Press Machine including double leg and single leg jump squat movements. Each session you will be provided with your workout routine with your weights already preset. Body weight will be regularly taken at these sessions during the training program. If the weight regimen is too easy, or hard, for you, you will approach a trainer and ask for a change in lifting weight. They will record this change on your workout sheets. The programs are structured to gradually increase in difficulty as you progress through the study.

Home Training Sessions: In addition to the in-person training sessions, you will perform approximately three self-led home training sessions per week. These home training sessions will each include approximately two exercises which can be completed in ~10-15 minutes. Each session will include a plyometric exercise (i.e. broad jumps, single leg jumps) and a lower body strength training exercise (i.e. step ups). To monitor compliance and form, you will be asked to video record the home training sessions on your phone or other device and show study trainers the recording at the subsequent in-person training session. You will set up your device to fully show you performing the exercise. You will not be required to show your face in the video (just your body) if this makes you more comfortable. Please ensure there are no sensitive or private images or images of other people who have not consented to being recorded. After demonstrating that the home training session was completed, you will be able to delete the video. The University of Pittsburgh Neuromuscular Laboratory will document compliance but will not retain any videos of home training sessions.

What are the possible risks, side effects, and discomforts of this research study?
Previous human research studies have shown that the nature and number of adverse events associated with similar studies are rare. Previous work within our laboratory has revealed the following risks with the proposed testing procedures:

DXA scanning and the High-Res pQCT (HR-pQCT) will expose you to minimal levels of radiation. For the DXA, you will be exposed to 0.001 mSv for each spine scan, 0.001 mSv for each hip scan, and 0.003 mSv for each total body scan. The HR-pQCT dose is less than 5 μSv (0.005 mSv) per scan. Across the entire study, participants will complete 9 DXA scans and 6 HR-pQCT scans equivalent to 0.02 mSv from DXAs and 0.03 from HR-pQCT, thus 0.05 mSv's total. This is equivalent to about 5 days of background radiation or a roundtrip from New York to LA. Due to the low amounts of radiation, risk of adverse effects is low.

Muscle soreness of the leg muscles is a common risk associated with the 1RM, load and intense training and testing protocols. This soreness typically develops 2-3 day after the fatiguing protocol and will last approximately 2-3 days. The soreness experienced will be no greater than that experienced during a "hard" training run or race. To reduce the risk of injury during 1RM testing, you will be under the supervision of trained staff members. They will teach you how to use the heavy weights and how to correctly perform the exercises. There will be several spotters to further prevent accidents.

Blood draws involve the use of a needle, which will be inserted into a vein. Therefore, there is a risk of infection, bruising, slight pain, or fainting. Only qualified researchers will complete this test, and thereby minimize any previously mentioned risk.

If any medical abnormalities are identified, your results will be sent to the study physician to review and discuss with you. The study physician will share with your primary caregiver with your permission.

We will use MR spectroscopy (MRS) to analyze the amount of fatty tissue in the bones of your spine and lower leg. During these scans you may feel warming of your skin and muscle tissue around the scanning sites. The warming is due to the magnetic energy used to perform the scan. We will limit the amount of MRS to avoid excessive warming of your skin and muscle, as longer scanning times can lead to greater warming effects.
There are currently no known health hazards from temporary exposure to the MR environment. If you experience discomfort due to warming during the MRS scan please inform the technician and the procedure will be stopped immediately.

There is a risk that someone could see your confidential information collected on study documents. This is called a breach of confidentiality. The potential risk of a breach in confidentiality is low, and we will take steps to protect your privacy. Safeguards to protect your confidentiality are discussed below under the heading, "Who will know about my participation in this research study?"

Text messages and emails are not encrypted or secure during their transmission, and it is possible they could be intercepted and used by others not associated with this study.

As with any experimental procedure, there may be adverse events or side effects that are not listed here, and some of these unknown risks could be permanent, severe, or life-threatening.

In order to ensure your safety during the testing procedures, the investigators and study team will take every precaution to watch for and prevent any possible adverse event. These precautions include proper instructions, correct testing sequences, proper subject positioning, and proper testing procedures. You will be given practice trials, which will allow for familiarization with the testing procedures.
Should you experience any pain or discomfort during the testing procedures, you will be given the opportunity to rest or terminate the testing session.

Home training videos present a possible risk of breach of confidentiality or possible discomfort from self-recording. To limit these risks, videos will not be stored on any other device other than the your own phone/device and secured by you via your own phone security. Once the video has been verified by the staff (when you show the video to the staff directly from your phone/device) you will be able to delete the video. You can also set up the recording device to ensure your face is not seen to reduce risk of possible discomfort from self-recording.

What are the possible benefits from taking part in this study?
As a participant, you will learn proper lifting and exercise techniques from and be motivated by a strength trainer through all exercises. You will also receive a thorough understanding of your body including body composition, exercise performance results, and how your body adapts with training. In addition, the better understanding of bone adaptations to exercise training obtained from this study may benefit tactical populations by improving physical readiness training in the military to reduce musculoskeletal injuries.

If I agree to take part in this research study, will I be told of any new risks that may be found during the course of the study?
You will be promptly notified if any new information develops during the conduct of this research study, which may cause you to change your mind about continuing to participate.

Will my insurance provider or I be charged for the costs of any procedures performed as part of this research study?
None of the services and/or procedures you receive during this research study will be billed to you or your health insurance. If you receive a bill or believe your health insurance has been billed for something that is part of the study, notify a member of the research team or UPMC Patient Billing Services.

Will I be paid if I take part in this research study?
Compensation is based upon number of testing sessions completed. You will receive:

- $300 for completing the 3 pre-intervention testing visits
- $200 for completing the 1 mid-intervention testing visit
- $500 for completing the 3 post-intervention testing visits

Thus, if you complete the study, you will receive $1,000 in total compensation. You will be paid on a reloadable debit card. If the total reimbursement for your participation in research is greater than $600 in a year, this will be reported to the Internal Revenue Service (IRS) as income. Your name, address, and social security number will be released to the Accounting Office and you will

receive a 1099 income statement. Individuals who do not provide a social security number may still participate in the research, but the IRS requires that 24% of the payment be sent by the institution to the IRS for 'backup withholding;' thus you would only receive 76% of the expected payment.

Who will pay if I am injured as a result of taking part in this study?
If you believe that the research procedures have resulted in an injury to you, please notify a member of the study team. The study team will contact the Principal Investigator, Dr. Bradley Nindl, who is listed on the first page of this form. If the injury is an emergency, emergency medical treatment for injuries solely and directly related to your participation in this research study will be provided to you by the hospitals of UPMC. Your insurance provider may be billed for the costs of this emergency treatment, but none of those costs will be charged directly to you. If the injury is not an emergency the study team will arrange for you to be seen by a doctor to determine the extent of the injury. You do not waive any rights by signing this form.
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Who will know about my participation in this research study?
Any information about you obtained from this research will be kept as confidential (private) as possible. All records related to your involvement in this research study will be stored in a locked file cabinet. Your identity on these records will be indicated by a case number rather than by your name, and the information linking these numbers with your identity will be kept separate from the research records. Computer-based files will only be made available to personnel involved in the study through the use of access privileges and passwords. Prior to access to any study-related information, personnel will be required to sign statements agreeing to protect the security and confidentiality of identifiable information. Whenever feasible, identifiers will be removed from study-related information. Any information linking your personal information to the your subject number will be kept on the project coordinator's computer only and locked with a password. De-identified data, samples, and genetic data from samples may later be shared with other researchers for future research. Additionally, you will not be identified by name in any publication of research results unless you sign a separate form giving your permission, or release.

A subset of the samples (16 females and 16 males) will be sent to GeneWiz, a third-party vendor, for genetic analyses. Samples sent to GeneWiz will only be labeled with your number and timepoint; no personal identifiable data will be shared with GeneWiz. The results of the GeneWiz analyses will be used to guide targeted genetic analyses in all subjects in the laboratory-based training group. Currently, whole genome sequencing is not planned for this study, but your sample could possibly undergo whole genome sequencing in the future. This means identifying your entire unique genetic code from your biological parents.

The risk of doing genetic studies includes the potential for a breach of confidentiality, which means someone could see your genetic testing results who is not authorized. The information could be used to affect what insurance or jobs you may be able to get. Or it could affect your decision to have children. It could also cause stress and conflict in your family relationships, as it can confirm who is a child's father, identify a risk for a certain disease, or cause you or other people to have negative feelings if the results show you may be more likely to get certain diseases.

A Federal law, called the Genetic Information Nondiscrimination Act (GINA), generally makes it illegal for health insurance companies and group health plans to use genetic information in making decisions regarding your eligibility or premiums. GINA also makes it illegal for employers with 15 or more employees to use your genetic information when making decisions regarding hiring, promoting, firing, or setting the terms of employment. This new Federal law does not protect you against genetic discrimination by companies that sell life, disability, or long-term care insurance. GINA does not protect you against discrimination based on an already-diagnosed genetic condition or disease.

Your data and specimens used in this research study may contribute to a new discovery or treatment. In some instances, these discoveries or treatments may be of commercial value and may be sold, patented, or licensed by the investigators and the University of Pittsburgh for use in other research or the development of new products. You will not retain any property rights, nor will you share in any money that the investigators, the University of Pittsburgh, or their agents may realize.

Who will have access to identifiable information related to my participation in this research study?

In addition to the investigators listed on the first page of this authorization (consent) form and their research staff, the following individuals will or may have access to identifiable information related to your participation in this research study:

Authorized representatives of the University of Pittsburgh Office of Research Protections and the Department of Defense may review your identifiable research information (which may include your identifiable medical information) for the purpose of monitoring the appropriate conduct of this research study.

The study has appointed a medical monitor, Dr. Allison Bean who will have access to deidentified testing results as part of monitoring the safety of the study. If the study team finds something unexpected on any of the tests, the test results and identifiable information may be provided to Dr. Bean so that she can discuss the results with you.

In unusual cases, the investigators may be required to release identifiable information related to your participation in this research study in response to an order from a court of law. If the investigators learn that you or someone with whom you are involved is in serious danger or potential harm, they will need to inform, as required by Pennsylvania law, the appropriate agencies.

Per University of Pittsburgh policy all research records must be maintained for at least 7 years following final reporting or publication of a project.

De-identified data will be shared between the University of Pittsburgh and Department of Defense. Your identifiable information will not be included in any of the data that is shared.

We may share de-identified data, including genetic or specimens with other researchers or federal repositories in the future.

Will I have access to all of my results from the study?
At the end of the study, you will be given a sheet with your body composition and bone mineral density data from the pre-intervention, mid-intervention and post intervention testing visits. No other study data will be available to you, including genetic analysis results.

Is my participation in this research study voluntary?
Your participation in this research study, to include the use and disclosure of your identifiable information for the purposes described above, is completely voluntary. Whether or not you provide your consent for participation in this research study will have no effect on your current or future relationship with the University of Pittsburgh. Whether or not you provide your consent for participation in this research study will have no effect on your current or future medical care at a UPMC hospital or affiliated health care provider or your current or future relationship with a health care insurance provider.

May I withdraw, at a future date, my consent for participation in this research study?
Yes. You may withdraw, at any time, your consent for participation in this research study. Any research information recorded for or resulting from your participation in this research study prior to the date that you formally withdrew your consent may continue to be used and disclosed by the investigators for the purposes described above.
To formally withdraw your consent for participation in this research study you should provide a written and dated notice of this decision or verbally state your formal withdrawal to one of the research team members listed on the first page of this form. Your decision to withdraw your consent for participation in this research study will have no effect on your current or future relationship with the University of Pittsburgh. Your decision to withdraw your consent for participation in this research study will have no effect on your current or future medical care at a UPMC hospital or affiliated health care provider or your current or future relationship with a health care insurance provider.

If I agree to participate in this research study, can I be removed from the study without my consent?
You may be removed from this study in the event that you are unable to perform the required tasks, including if you:

- have an inability to complete all testing sessions,
- begin to use a medication incompatible with measurement of reproductive, metabolic, or bone-related hormones (including thyroid medications, glucocorticoids) or which includes anti-coagulants and may interfere with any of the study outcomes
- become pregnant,
- are injured over the course of the study and unable to complete training,
- are no longer cleared by a physician in the case of injury or outside adverse event, or
- are unable or unwilling to follow proper procedures during testing sessions.

Any injury during the study's testing or training sessions will be assessed by the study team through questioning and physical examination. You may also be removed from the study due to an injury from an unrelated event if you are unable to complete the training or testing sessions.

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VOLUNTARY CONSENT

All of the above has been explained to me and all of my current questions have been answered. I understand that I am encouraged to ask questions about any aspect of this research study during the course of this study, and that such future questions will be answered by the researchers listed on the first page of this form. Any questions I have about my rights as a research participant will be answered by the Human Subject Protection Advocate of the IRB Office, University of Pittsburgh (866-212-2668). By signing this form, I agree to participate in the research study. A copy of this consent form will be given to me.

_____
Participant's Name (Print)

_____ _____
Participant's Signature Date

CERTIFICATION OF INFORMED CONSENT

I certify that I have explained the nature and purpose of this research study to the above-named individual(s), and I have discussed the potential benefits and possible risks of study participation. Any questions the individual(s) have about this study have been answered, and we will always be available to address future questions, concerns, or complaints as they arise. I further certify that no research component of this protocol was begun until after this consent form was signed.

_____ _____
Printed Name of Person Obtaining Consent Role in Research Study

_____ _____
Signature of Person Obtaining Consent Date