The impact of jumping exercise and collagen supplementation on bone turnover markers in healthy males

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON51015

Source
ToetsingOnline

Brief title
CollaJump

Condition

- Other condition

Synonym
Bone health, osteoporosis

Health condition

botgezondheid

Research involving
Human

Sponsors and support

Primary sponsor: HAN University of Applied Sciences
Source(s) of monetary or material Support: NWO;KIEM 2020

Intervention

Keyword: bone mineral density, collagen supplementation, cycling, impact exercise

Outcome measures

Primary outcome

Bone turnover markers: P1NP and B-CTX

Secondary outcome

Parathyroid hormone, testosterone, calcium

Study description

Background summary

Bone health is a critical factor for athletes as bones provide the levers for muscles to move the joints, and strong bones decrease the risk of bone fractures. Particularly cyclist can benefit from exercise and nutrition interventions to stimulate bone health, as this population is characterized by an impaired bone mineral density. Jumping exercise has been identified as a feasible and effective exercise intervention to stimulate collagen synthesis and increase BMD. However, there is considerable debate on the optimal volume and frequency of jumping exercise to maximize bone collagen synthesis. Furthermore, preliminary evidence suggests that collagen supplementation may also stimulate bone collagen synthesis. It is currently unknown whether collagen supplementation can augment the increase in bone collagen synthesis after jumping exercise.
There is evidence to suggests that cycling exercise training has a negative effect on bone metabolism. Hence, it may me of particular interest for elite cyclists to know whether jumping exercise and collagen supplementation can counteract the deleterious effects of cycling exercise training on bone tissue.

Study objective

The main objective of the current project is to assess the effect of jumping exercise combined with collagen supplementation on bone turnover. This will be

investigated by means of two sub-studies.
Sub-study 1a: To examine the effect of collagen supplementation and jumping exercise on bone turnover markers in healthy males.
Sub-study 1b: To examine the effect of collagen supplementation and jumping exercise on bone turnover markers after a cycling exercise bout in trained cyclists.

Study design

Randomized, cross-over intervention studies

Intervention

Study 1a: for 3 days, volunteers will consume either a collagen protein supplement (20 g; 1 or 2 x p/d) or an isocaloric placebo supplement (maltodextrin; 1 x p/d), additional to their habitual diet, combined with a 5 minute jumping exercise session. Study 1b: for 2 days, volunteers will consume either a collagen protein supplement (20 g; 2 x p/d), additional to their habitual diet, combined with a 5 minute jumping session or no intervention.

Study burden and risks

Participants will visit our lab 5 (study 1a) and 4 (study 1b) times. Overall, 26 (1a) and 16 (1b) blood samples (10 mL/sample) will be drawn (via an intravenous canula or vena punction). The discomfort of this procedure is transient and is comparable to having an injection by a needle, or donating blood.
Participants will have to perform non-exhaustive rope skipping exercise, which is meant to stimulate bone synthesis.
Test products (collagen) are commercially available, food-grade food ingredients that are safe in the amounts consumed in this study.
Body composition will be assessed once by DXA. The measurement is painless, non-invasive and involves only low radiation exposure (<10 *Sv).
Two food dairies will be collected in the week before the first trial to assess baseline dietary intake. Three (2 in study 1b) food diaries will be collected during the 3-day (2-day study 1b) intervention period of the first trial, for use of diet quantity replication during trial 2 and 3 (for study 1a only) .
Volunteers have to perform a 2 h moderate intensity cycling exercise bout (1b only).
Participants will perform an exercise tests to determine VO2max. Although the exercise test can be considered as strenuous exercise, the burden is limited to temporary discomfort and muscle soreness (1b only)

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Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Male
Age *18 and *35 years.
BMI *18.5 and *27.5 kg/m2
Willing to give blood samples

Exclusion criteria

* Blood donation during the study period
* Currently smoking
* Severe allergy to nuts or intolerance to gluten, as supplements are being produced in factory that may have used nuts or gluten previously

* Consumption of >21 alcoholic beverages per week
* Use of antibiotics in the past month
* Medical condition that can interfere with the study outcome (i.e. cardiovascular disease, pulmonary disease, rheumatoid arthritis, orthopaedic disorders, renal disease, liver disease, diabetes mellitus, inflammatory disease, cognitive impairment, and thyroid or parathyroid disease))
* Use of medications known to interfere with selected outcome measures (i.e. corticosteroids, , statins, fenofibrate, beta-blocker)
* (Chronic) injuries of the locomotor system that can interfere with the intervention.
* Current participation in another biomedical research study.

Study design

Design

Study type:	Interventional
Intervention model:	Crossover
Masking:	Single blinded (masking used)
Control:	Uncontrolled
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	20-04-2021
Enrollment:	30
Type:	Actual

Ethics review

Approved WMO

Date:	19-04-2021
Application type:	First submission
Review commission:	METC Z: Zuyderland-Zuyd (Heerlen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL76454.096.21