S.I.T.E.M.S.H

INTERNATIONAL SOCIETY FOR SKIING TRAUMATOLOGY AND WINTER SPORTS MEDECINE

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Alpine Skiing for Prevention and Therapy of Osteoporosis

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SALK
FEDERAL HOSPITAL SALZBURG

PARACELSUS
MEDIZINISCHE PRIVATUNIVERSITÄT

Is alpine skiing dangerous or safety?

Alpine skiing is one of the safetiest sports

Alpine skiing has an extremely positive impact on health

University Clinic Salzburg, PMR
Prof. Anton Wicker

But – this cannot be said of Alpine Ski Racing!

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How safe is public or common alpine Skiing

What studies are saying?

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In Austria 9 million skiers per year

90 000 injuries (the most of them not severe)

100 skiers – one injury

Statistically one alpine skier suffers 0,3 injuries in 1000 ski hours

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The risk of an injury

is much more lower than

in the most common ball games

like soccer, handball, volleyball

and basketball

Since 1979 the number of alpine ski accidents is reduced about 50% in Austria

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Genderspecific distribution of injuries in alpine skiing in % (ÖSV 2010/2011)

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Head (Men 15, Women 9)

Shoulder, Back, Neck (Men 27, Women 11)

Arm (Men 6, Women 7)

Abdomen, Chest (Men 4, Women 2)

Hip and Pelvis (Men 4, Women 3)

Femur (Men 5, Women 3)

Knee (Men 25, Women 53)

Shank (Men 11, Women 8)

Ankle (Men 4, Women 4)

Carving Ski

- how dangerous ?

Exercise for prevention and therapy of osteoporosis – what do we know?

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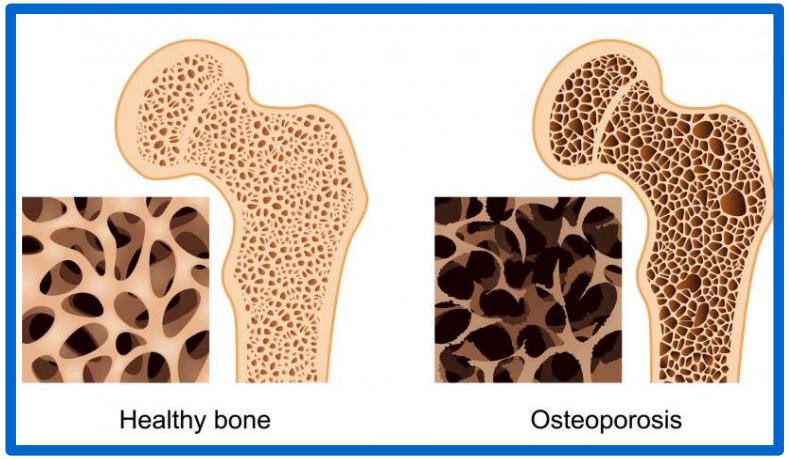
Bad balance
is obviously associated with decreasing posture – followed by increase of number of falls and fractures

There is an interaction of osteoporosis,
balance,
power,
endurance,
sensomotoric processes and falls

(PFEIFER 2004)

The following factors are associated with a decreasing bone mass density:



physical inactivity

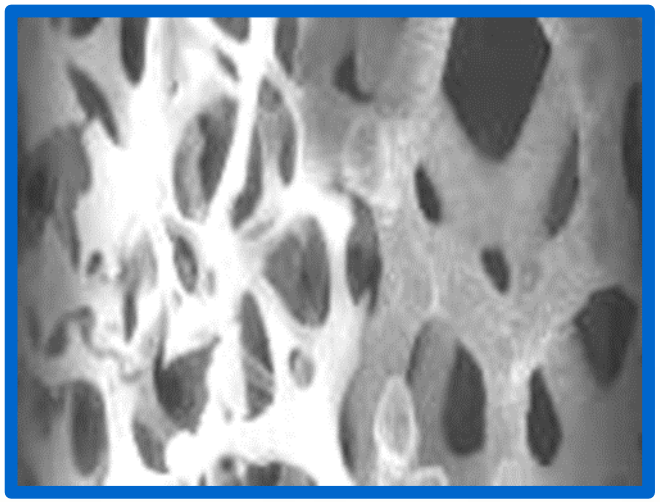
(immobilisation, paralysis, stroke etc.)

In prevention and therapy of osteoporis it is essential to force physical activity beside optimizing nutrition

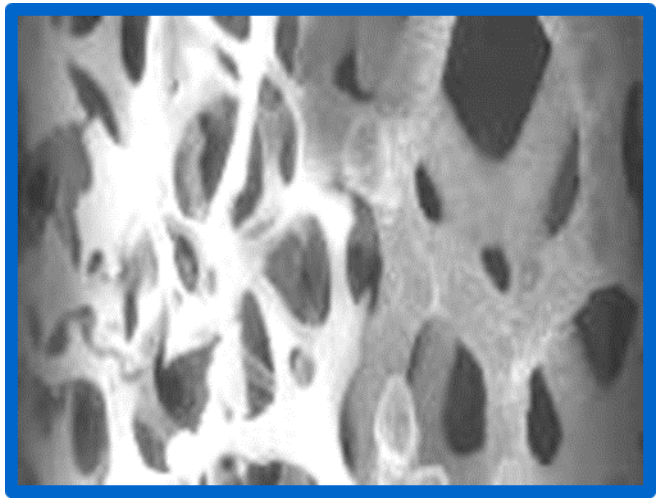
(BONAIUTI 2002 – Cochrane Database)

The peak bone mass is genetical determined but is strong influenced by lifestyle

(PLATEN 1998)



The development of bone mass density comes up to a maximum in the third decennium



Physical activity influences the development of bone mass density in a very positive manner

(UUSI-RASI 2005, Osteoporosis Int.)

Osteoporosis

- a problem of childhood

The bone mass density is controlled by mechanical forces loading the bone

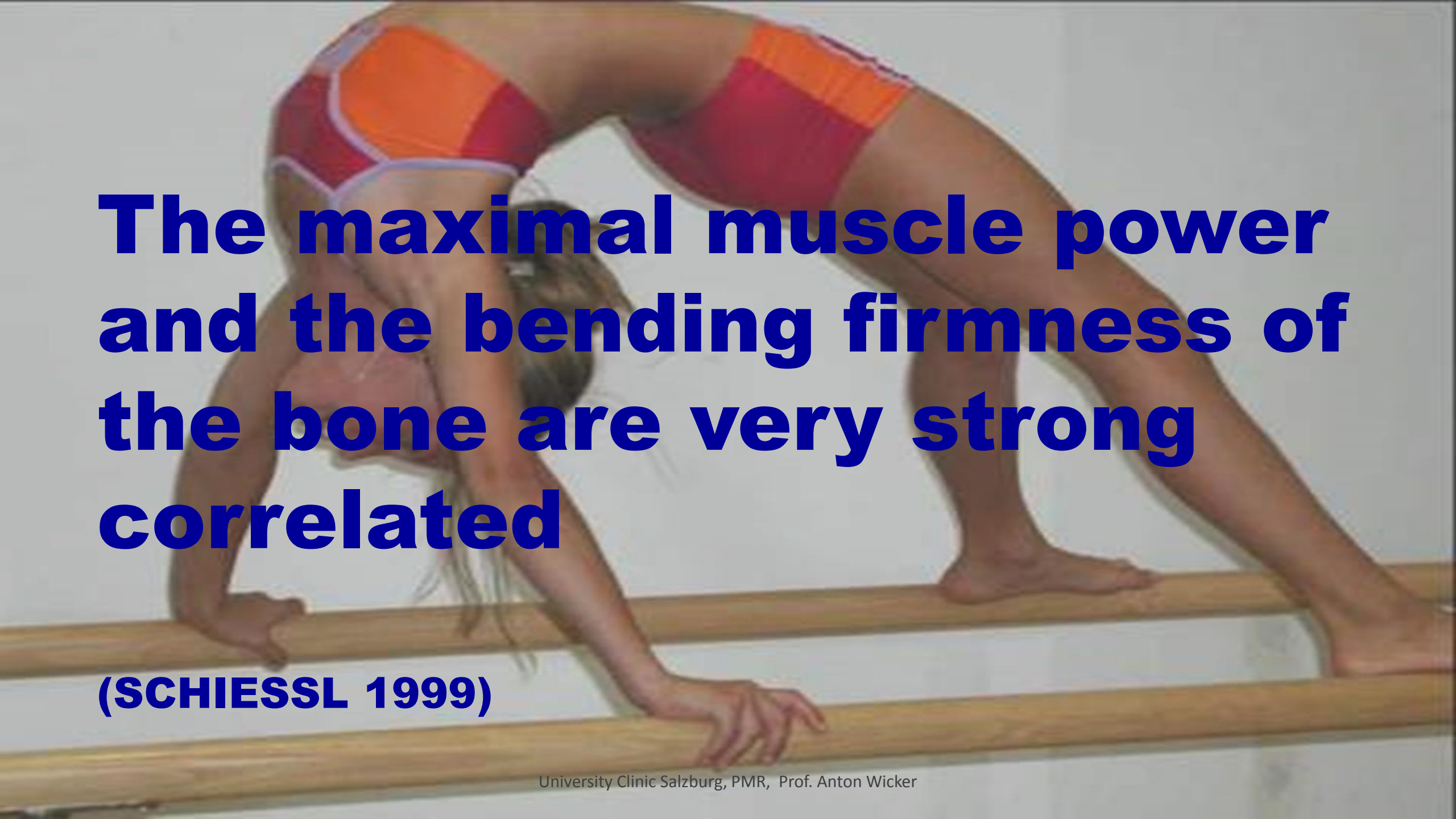
(UTAH PARADIGMA 1999)

These forces are generated in an essential way by muscles and not by body weight

(UMEMURA 1997)

Muscle power and bone stability are correlated

(WOLFF 1998)



The maximal muscle power and the bending firmness of the bone are very strong correlated

(SCHIESSL 1999)

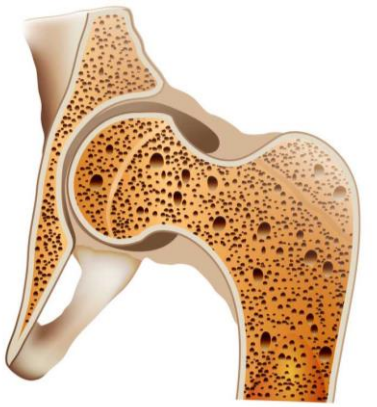
If the bone is loaded by force a change of the length is induced

The change of his length parted by his length before the loading is named “STRAIN”

We are working with the term “MICROSTRAIN”

Below 800 Microstrain it comes to a remodeling of the bone

Between 800 to 1600 Microstrain there is no change in the bone



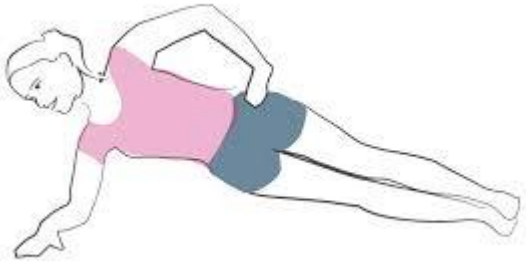
By loading forces of more than 1600 Microstrain there is a modeling of the bone

These forces and limitation factors are influenced and limitated by:

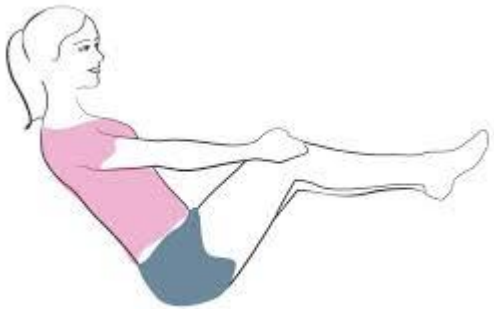
- Hormones
- Cytokines
- Calcium
- Vitamines
- Growing factors
- Life style

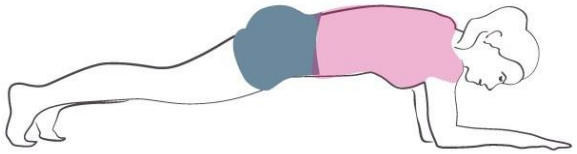
For bone health physical activity must be dosed in that manner that the zone of conservation is crossed – more than 1600 Microstrain – is crossed over

High impact loading – fast walking, running, stepping up and down



Strengthening the muscles power training





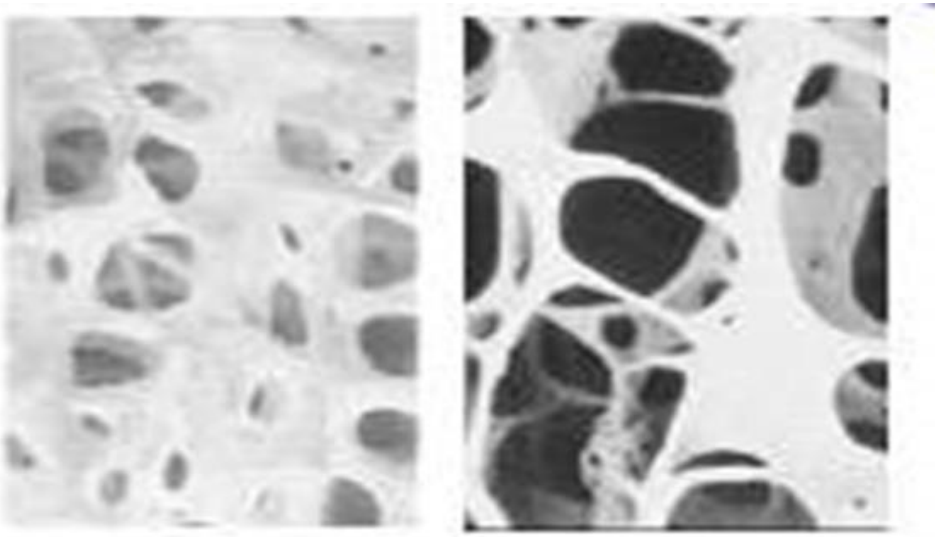
most important in daily life

KEEP ON
IN PHYSICAL ACTIVITY

Avoid IMMOBILITY

Immobile patients are loosing more bone mass in one month than normally in one year

(DELMAS Osteoporosis International)

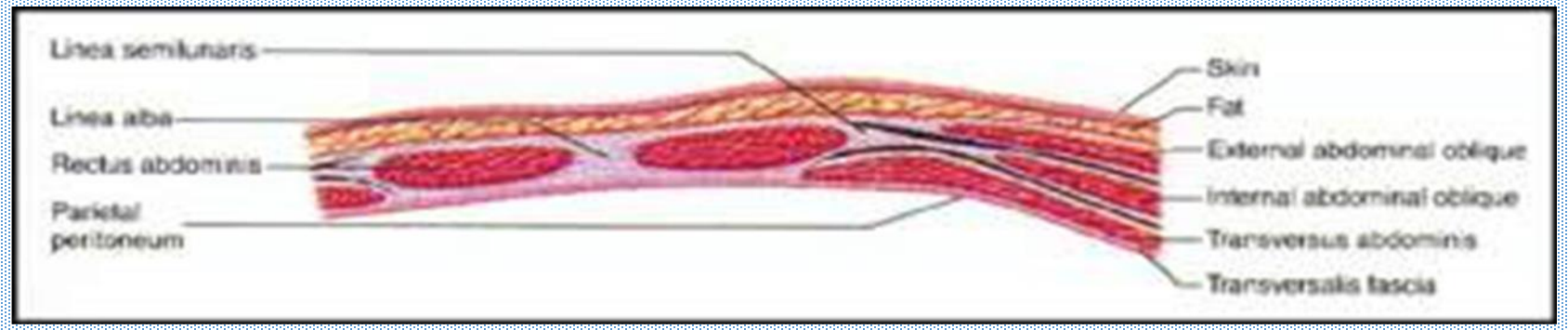


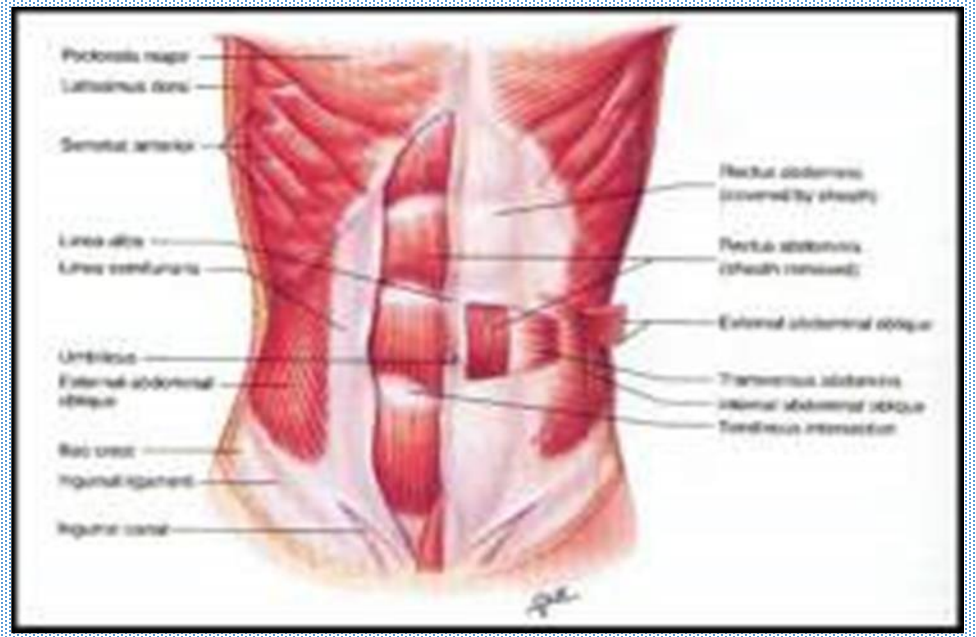
Prevention of falls

balance

fear of movement

trunk stabilisation



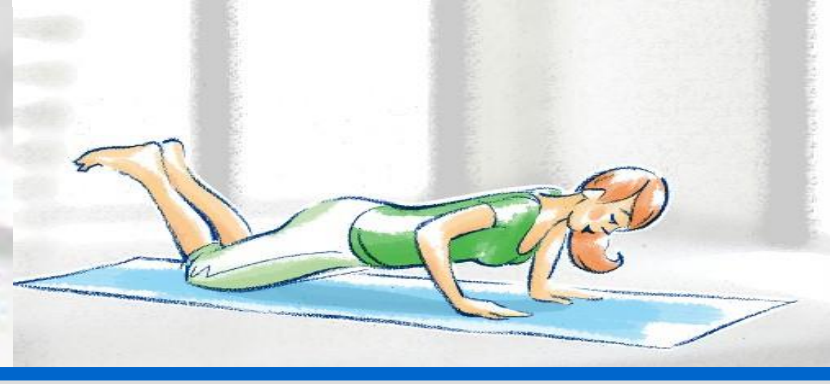


trunk stabilisation

balance training

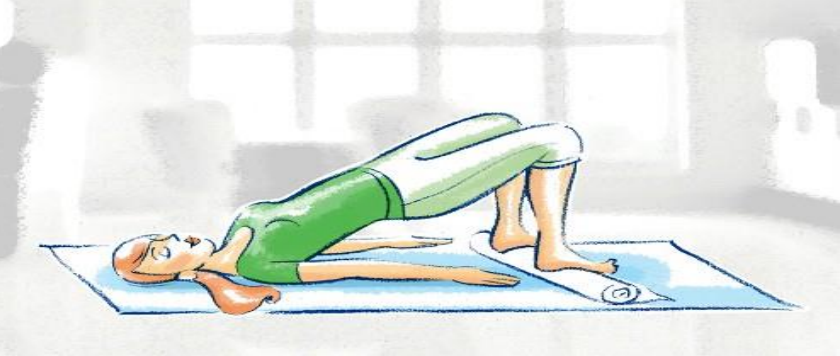
vibration „Galileo“





Alpine Skiing offers everything from balance, koordination, strength, power, flexibility, vibration and speed





Alpine skiing is a multi-tasking sport and so also important for the health of the brain

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For prevention of osteoporosis alpine skiing is a very safe and pleasure tool

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For therapy of osteoporosis it is required that the patient is experienced in alpine skiing

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