THE TIME IS NOW! - DON'T DELAY BEING PHYSICALLY ACTIVE

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TWO MAIN MESSAGES

**WITH REGARD TO LIFESTYLE RELATED DISEASE**

There is a difference between chronological age and biological age, thus the sole term "aging" in this field can be misleading

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It may be more effective to Prevent the effects of inactive aging rather than to try to reverse the consequences
“Ageing” is a major risk factor for cardiovascular events. However, disease progression with age is dependent on lifestyle, including the level of physical activity.
Aging and the Influence of Physical Activity

Set Point Theory
The graded effects of physical activity/exercise on ageing

Below Set Point
Insufficient physical activity
Aging interacts with the negative effects of inactivity

At Set Point
Sufficient physical activity to counteract the effects of inactivity

Above Set Point
More than sufficient exercise
Enhancement of physiological function and athletic performance

Many consider this to be the norm
Uncertain health trajectory
Non-optimal ageing
Extended morbidity

But this should be considered the norm
Health in later life
Optimal ageing
Compressed morbidity

Healthspan optimised (assuming no overtraining pathologies)
Optimal ageing - Trajectory of decline in athletic performance reflecting biological ageing. Compressed morbidity

Lazarus and Harridge JPhysiol 2017
VASCULAR FUNCTION IN RELATION TO LIFELONG PHYSICAL ACTIVITY LEVEL IN OLDER ADULT MEN

**GROUPS**
Young: 20-30 yrs
Older: 60-65 yrs-sedentary
60-65 yrs-well-trained

**FITNESS LEVEL**

<table>
<thead>
<tr>
<th>VO₂ max (ml/min/kg bw)</th>
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<tbody>
<tr>
<td>Young</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>40</td>
</tr>
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<td>30</td>
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<td>20</td>
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**SKELETAL MUSCLE VASCULAR FUNCTION: A GOOD MARKER OF OVERALL VASCULAR HEALTH**

**CHANGE IN LEG VASCULAR CONDUCTANCE WITH ACH INFUSION**

Young
Aged Tr
Aged Untr

Mortensen, Nyberg et al. J. Physiol 2012
Vascular function according to lifelong physical activity level in women

Age: 58-65 yrs

High intensity
Moderate intensity

Well-trained
Moderately trained
Sedentary

Gliemann et al. MSSE 2020.
So it is clear that regular physical activity promotes healthy aging, but are the benefits the same regardless of when in life you become active?

A study in women
ESTROGEN LOSS IN WOMEN AT MENOPAUSE IS ASSOCIATED WITH A RAPID DECLINE IN VASCULAR HEALTH

Vascular function in women of different ages

Menopausal transition

Years of age

Vascular function in late pre- and recent postmenopausal women - 4 years of difference in age

Adjusted FMD

0 5 10 15 20

20 15 10 5 0

Vascular function

Nyberg et al. Hypertension 2016

Celermajer et al. JACC 1994
Is it more beneficial to train soon after rather than later after menopause in women?

A comparison of training effects in recent and late postmenopausal women

**Participant Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>EPW (n=14)</th>
<th>LPW (n=13)</th>
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<tbody>
<tr>
<td><strong>Age – yr.</strong></td>
<td>55.7 ± 2.8</td>
<td>61.9 ± 4.5###</td>
</tr>
<tr>
<td><strong>Years after menopause – yr.</strong></td>
<td>4.1 ± 1.1</td>
<td>13.0 ± 3.8###</td>
</tr>
<tr>
<td><strong>Body weight – kg</strong></td>
<td>69.6 ± 8.2</td>
<td>68.4 ± 8.0*</td>
</tr>
<tr>
<td><strong>Body mass index – kg m⁻²</strong></td>
<td>24.9 ± 2.3</td>
<td>24.5 ± 2.4*</td>
</tr>
</tbody>
</table>

Training intensities were similar between the groups

<table>
<thead>
<tr>
<th>&lt;5Yrs after menopause</th>
<th>&gt;10Yrs after menopause</th>
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</thead>
<tbody>
<tr>
<td><strong>EPW</strong></td>
<td><strong>LPW</strong></td>
</tr>
<tr>
<td>17.8 ± 6.4%</td>
<td>19.3 ± 9.4%</td>
</tr>
<tr>
<td>28.8 ± 4.8%</td>
<td>28.8 ± 4.2%</td>
</tr>
<tr>
<td>20.0 ± 5.8%</td>
<td>22.9 ± 6.9%</td>
</tr>
<tr>
<td>18.1 ± 4.0%</td>
<td>17.8 ± 6.5%</td>
</tr>
<tr>
<td>15.3 ± 6.5%</td>
<td>11.1 ± 4.6%</td>
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Eight weeks of training Floorball + spinning

Kate Wickham  Line Olsen
MARKERS INDICATING RISK OF BLOOD CLOTS

Clot microstructure

Platelet reactivity

<5Yrs after menopause
>10Yrs after menopause

<5Yrs after menopause
>10Yrs after menopause

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F
LIFELONG TRAINING AND EVEN JUST A SHORT PERIOD OF TRAINING OPPOSES THE DETRIMENTAL EFFECTS OF AGEING ON VASCULAR HEALTH IN MEN AND WOMEN

BUT

WOMEN ARE LIKELY TO HAVE BETTER VASCULAR HEALTH GAINS IF PHYSICAL ACTIVITY IS INITIATED PRIOR TO, OR AT, THE MENOPAUSAL TRANSITION, RATHER THAN LATER IN LIFE

OVERALL THERE IS EVIDENCE TO SUGGEST THAT IT IS BETTER TO PREVENT RATHER THAN REVERSE THE EFFECTS OF INACTIVE AGEING ON HEALTH
Training protocol: 24 sessions of a unilateral free-weight knee extension exercise with partial blood flow restriction through a manometer cuff set at 50% of complete vascular occlusion pressure.

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