

Collagen

Its rule within aging

**Dr. Jan-Dirk Fauteck
AESCULAPIUS international
Lodi / Italy**

Connective tissue

Cells

Fixed cells

Fibroblasts

Fibrocystic

Reticulum cells

mobile Cells

Leucocytes

Extra cellular Matrix

Fibres

collagen

reticular

elastics

matrix

Glycosamine

Proteoglycane

Glycoprotein

Different types of connective tissues (CT)

Mesenchyme	(embryonal CT)
colloidal CT	(umbilical cord)
reticular CT	(bone marrow and lymphatic tissues)
collagen CT	(unformed - tightly; netting – parallel fibered)
elastic CT	(Ligg. flava)
spino-cellular CT	(Ovary)
Adipose Tissue	(white and brown)

Types of connective tissues (CT)

Mesenchyme

colloidal CT

reticular CT

collagen CT



unformed collagen CT

tightly collagen CT



netting fibred

parallel fibred

elastic CT

spino-cellular CT

Adipose Tissue

Types of connective tissues (CT)

Mesenchyme

colloidal CT

reticular CT

collagen CT

elastic CT

spino-cellular CT

Adipose Tissue

tissue specific cells:

Fibroblast

Fibroblast

Myofibroblast

transient cell:

Granulocytes, Monocytes /

Macrophages, Lymphocytes, Mast cells

Kinds of connective tissues (CT)

Mesenchyme

colloidal CT

reticular CT

collagen CT

elastic CT

spino-cellular CT

Adipose Tissue

Fibres of extra cellular matrix:

Elastic fibres (Elastin, Fibrillin) and
Collagen fibres:

Type I: thick fibrils ($\alpha 1, \alpha 2/-g$) skin, bone, tendon,
ligaments, sclera, cornea

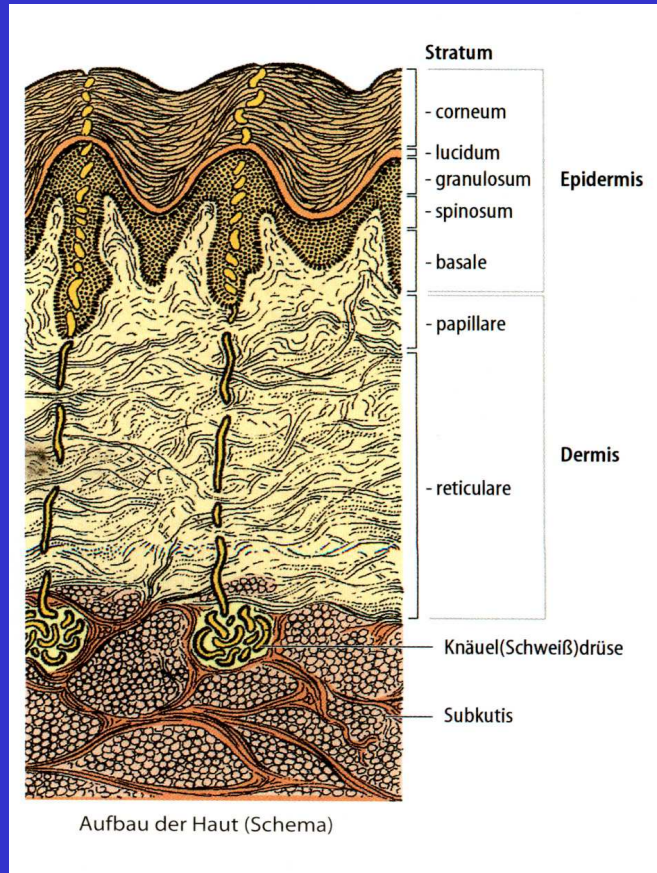
Type II: thin fibrils ($\alpha 1/-g$), hyaluronic cartilage

Type III: thin fibrils ($\alpha 1/\sim g$), skin reticulum, organs ,
vessels

Type IV: reticulum ($\alpha 1/+g$) Lamina densa basal, liver,
placenta

Type V: reticulum ($\alpha 1, \alpha 2, \alpha 3/+g$) matrix of cartilage
fatal bone, lung, muscle

Anatomy of the human skin



complex Structure

3 skin layer:

Epidermis

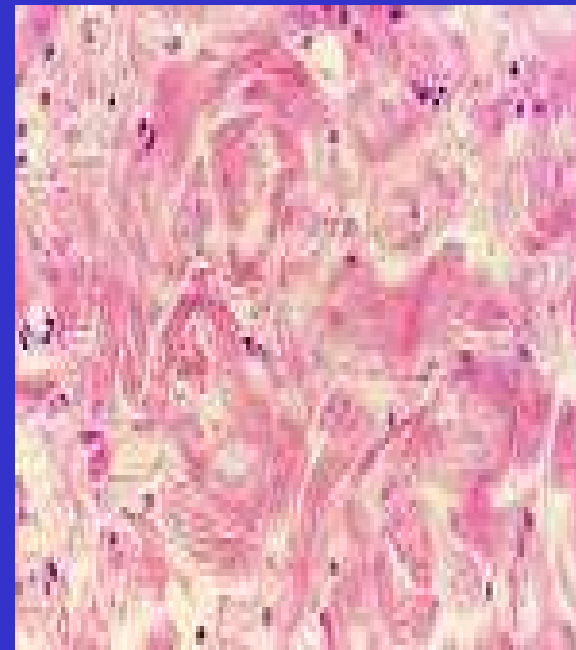
Dermis

Subcutaneous adipose tissue

collagen within the skin

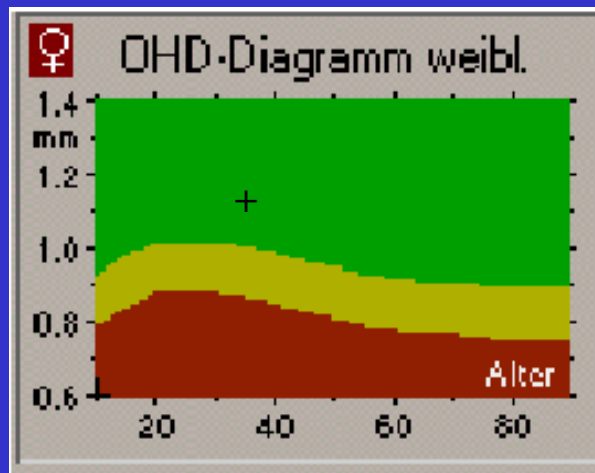
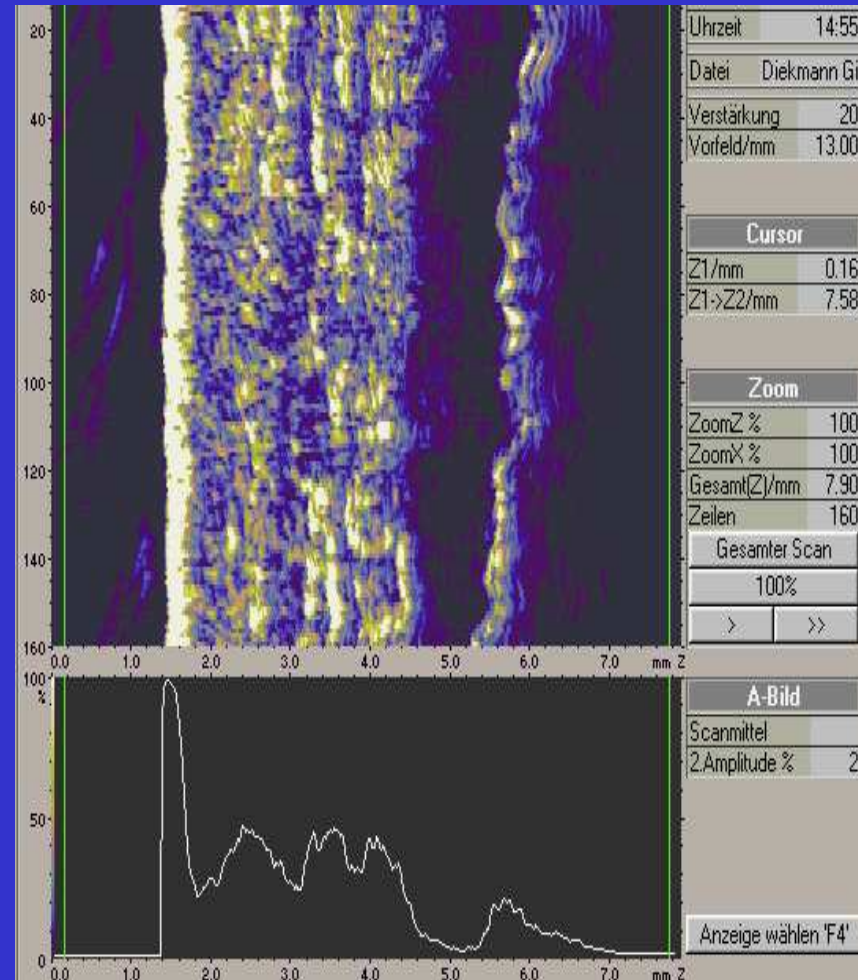


Unformed collagen of the skin

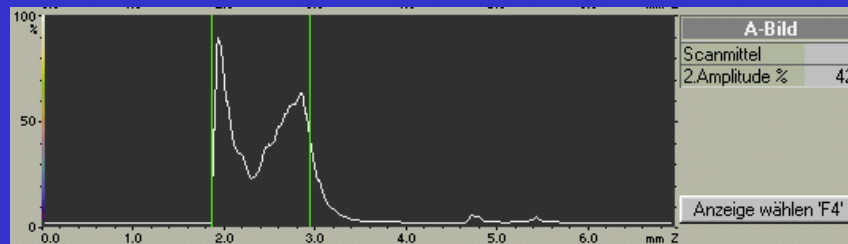


Fibro-reticular collagen of the skin

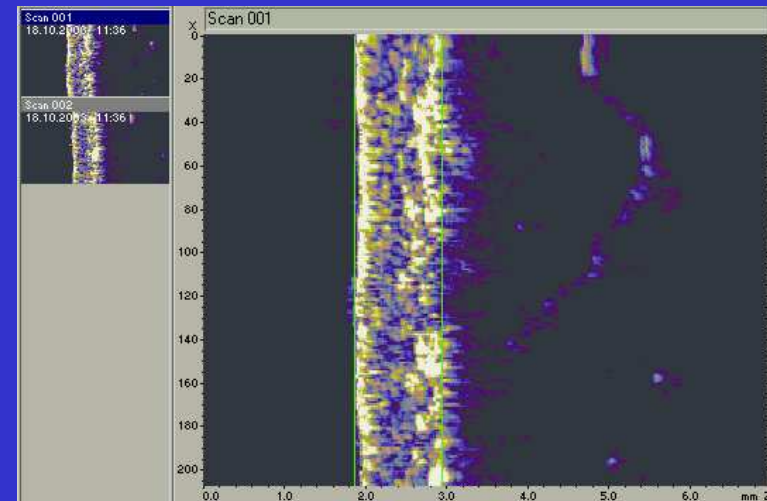
COLLAGENOSON®



Measurements of collagen and its relevance within skin aging



A-mode



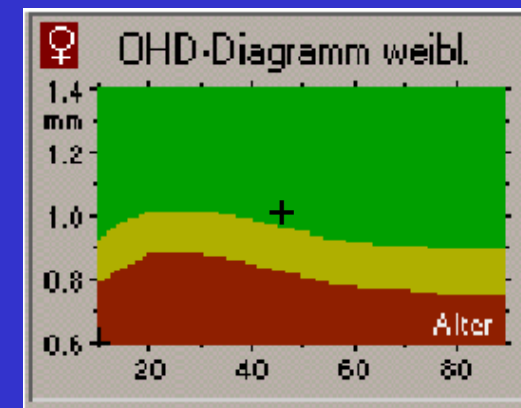
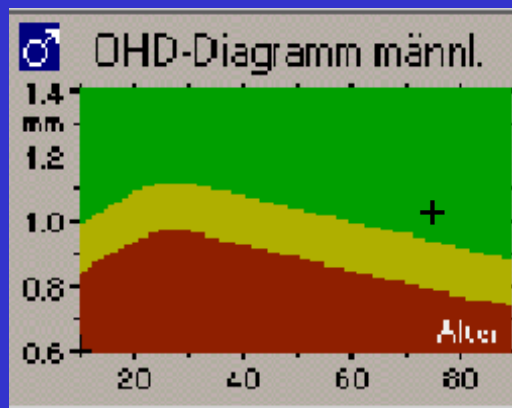
B-mode

The higher the A-mode, the brighter the points of B-mode

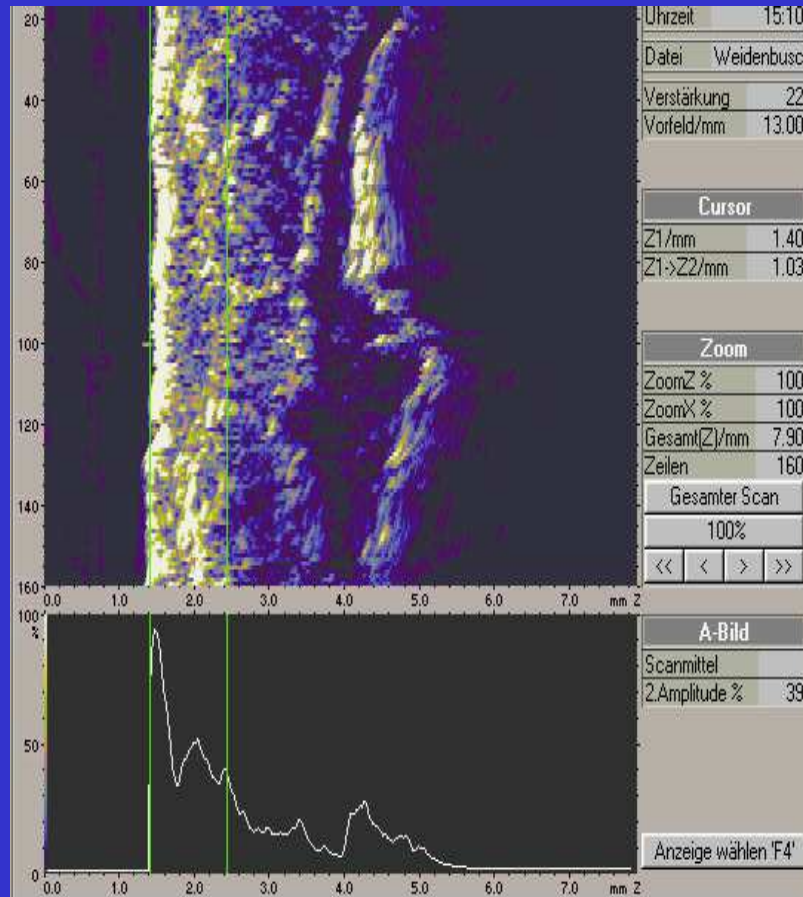
Measurements of collagen and its relevance within skin aging



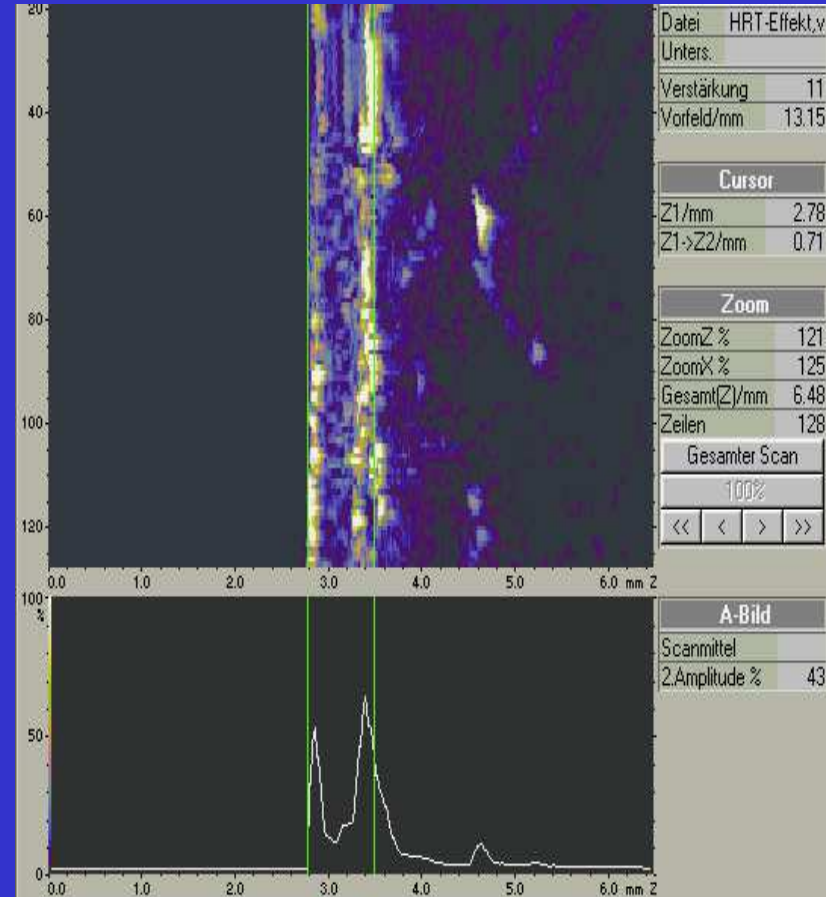
OHD
Hautdicke/mm 1.18



Skin aging

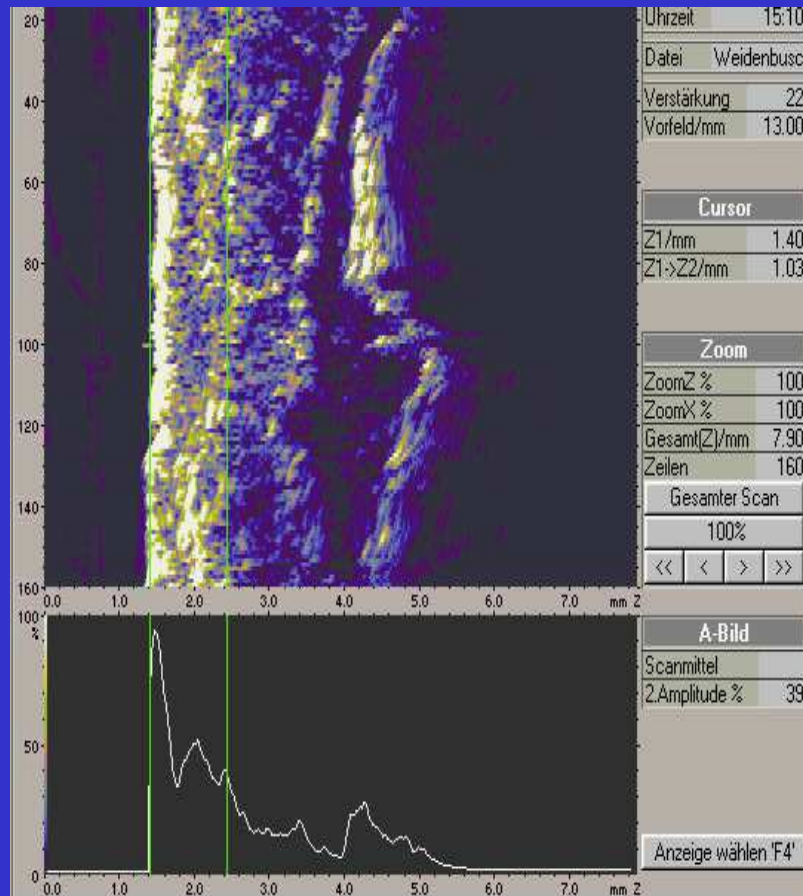


CONTROL

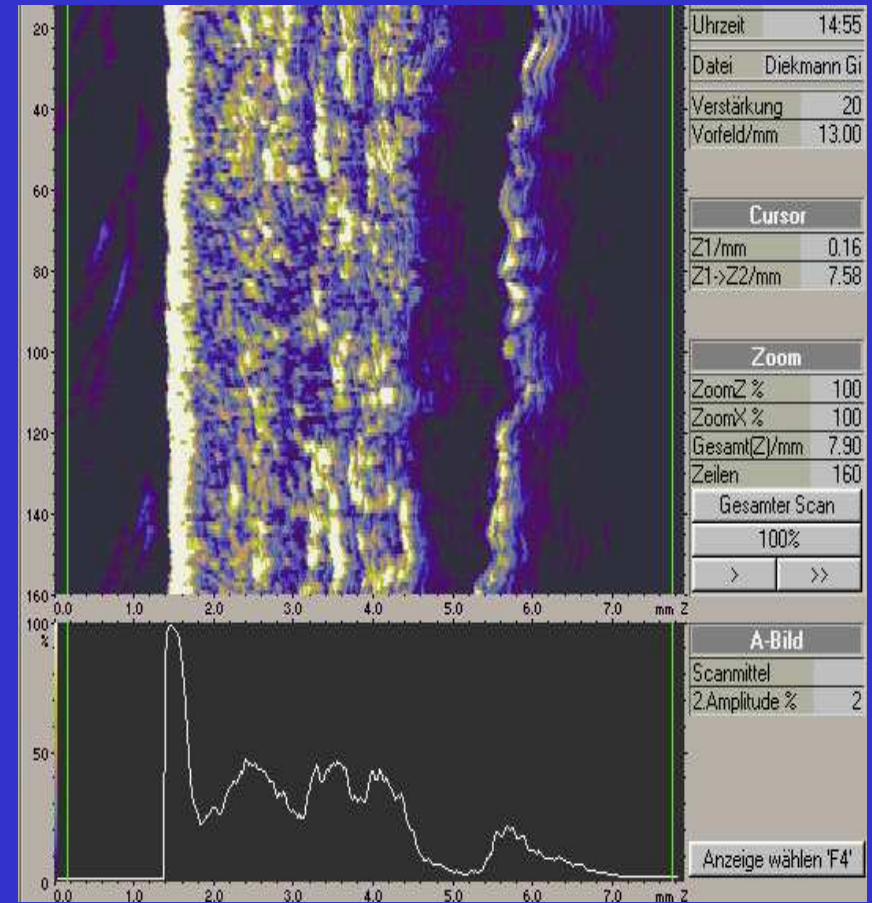


AGED SKIN

Scleroderma

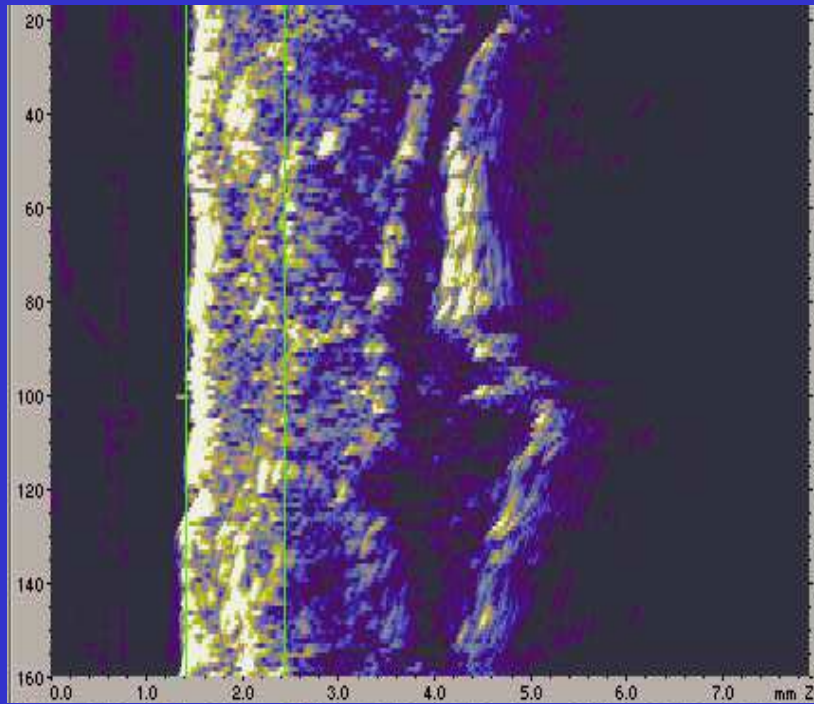


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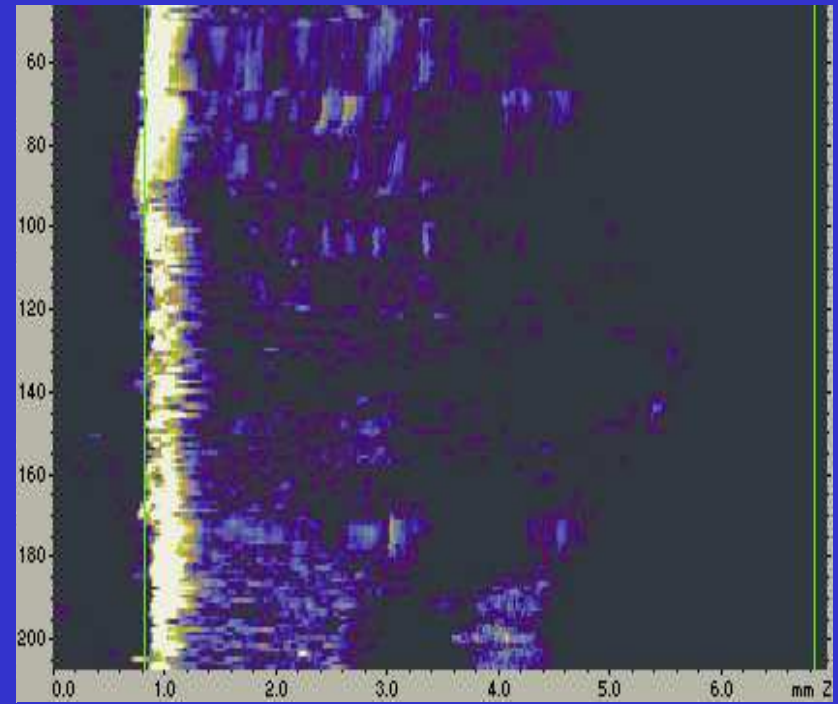


SCLERODERMIA

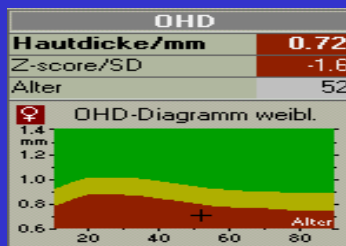
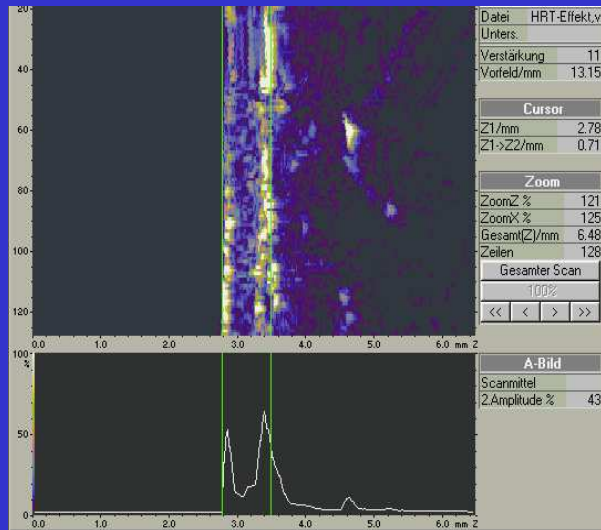
PSORIASI



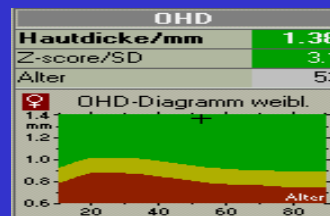
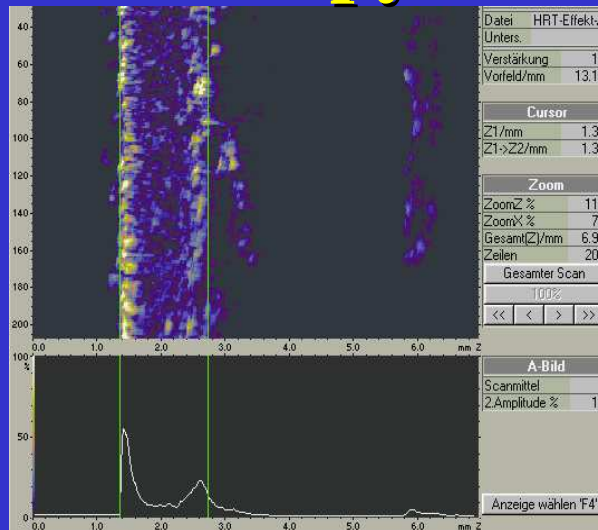
CONTROL



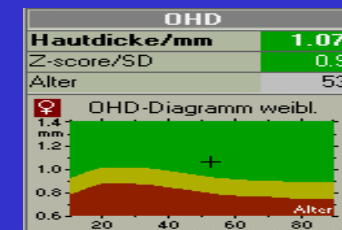
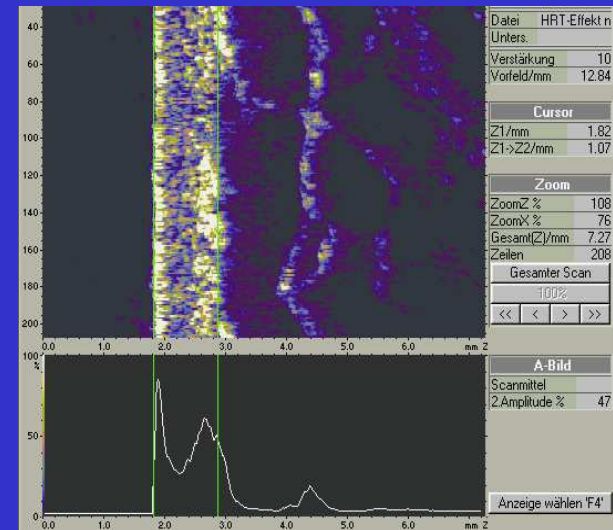
Measurements of collagen and its relevance within therapy control



Before HRT:
 Very thin skin, Menopause,
 Skin thickness to low
 OHD 0,72 mm



After 1 month HRT:
 Growth of skin thickness, mostly
 caused by water retention,
 skin thickness to high
 OHD: 1,38 mm

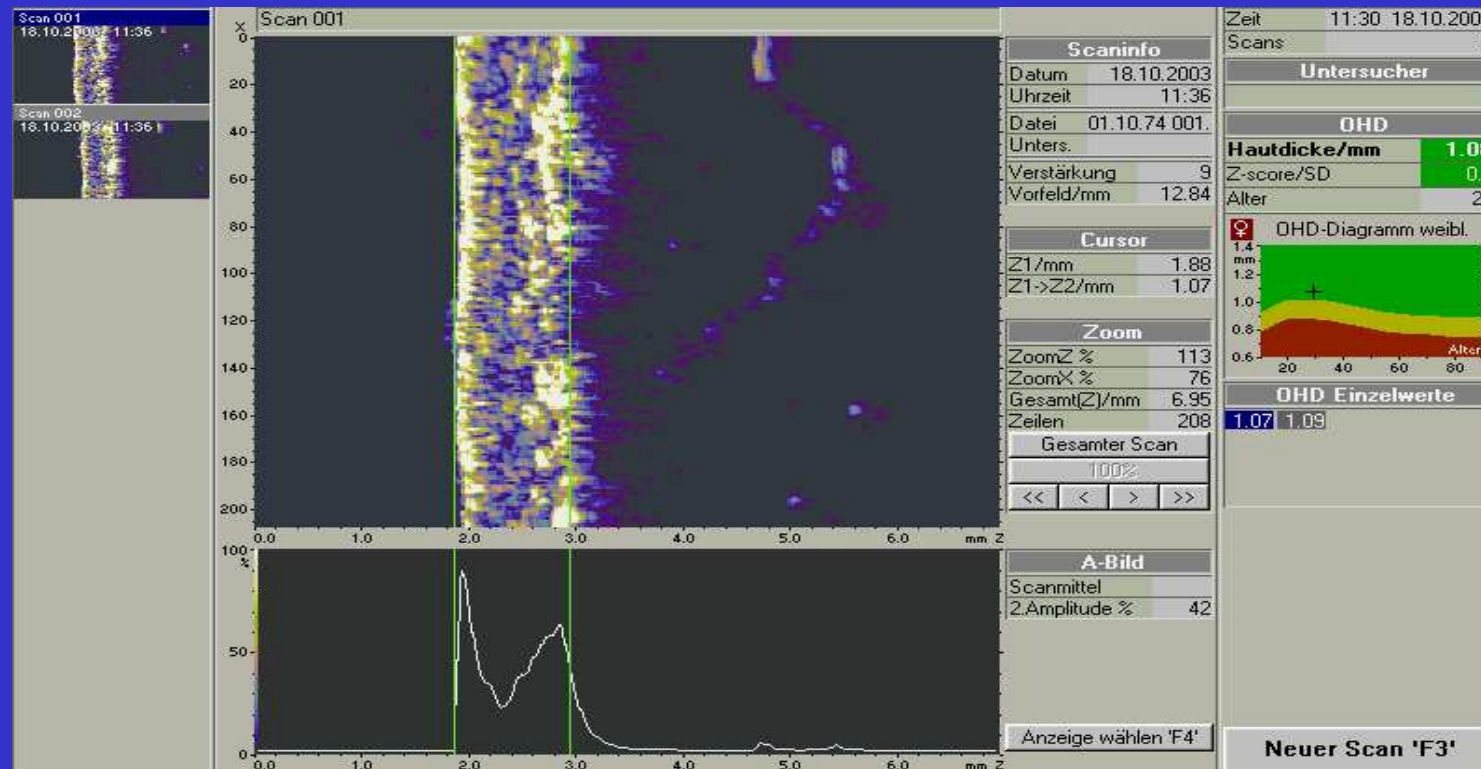


After 1 year HRT:
 General normalisation of skin
 and menopause symptoms,
 skin thickness normal
 OHD: 1,07 mm.

COLLAGENOSON® in Literature

- Chappard, D. et al., *Relationships between Bone and Skin Atrophies during Aging*: Acta Anat. 141 (1991), 239-244,
- M.P Brincat, R. Galea, Y. Muscat Baron: *Connettive tissue changes in the menopause- FIGO 94 Montreal*. Int J. Of Gynecol-obst. 9/94
- M.P Brincat, R. Galea, Y. Muscat Baron: *A screening model for osteoporosis using dermal skin thickness and bone densitometry- Progress in the management of the menopause – New York 1996*
- Brincat, M.P. et al., *Carotid Artery Wall Thickness in Postmenopausal Women treated with Hormone Replacement Therapy*: Poster, 8th International Congress on the Menopause, Sydney, (1996),
- Baron, Y.M. et al., *Increased Reduction in Bone Density and Skin Thickness in Postmenopausal Women taking long-term Corticosteroid Therapy:A suggested Role for Estrogen add-back Therapy*, Abstract, Climacteric., Sep. (1999) 2 (3),
- Jolić, V., *Skin Collagen Concentration in Women with Stress Urinary Incontinence evaluated by Ultrasound 20 MHz probe of OSTEOSON® -COLLAGENOSON DCC instrument*, University of Maribor, Slovenia (2003)
- Kenny, A. et al., *Validation of in vivo non-invasive High-Frequency Ultrasonography of the arterial wall layers*, Ultrasound in Med. & Biol., Vol. 27, (2006)
- Kenny A., Rodriguez-Macias, Lars Lind, Tord Neassen: *Thicker carotid intima and thinner media layer in subjects with cardiovascular diseases. An investigation using noninvasive high-frequency ultrasound.-Atherosclerosis* (2007)

Measurements of collagen and its relevance for osteoporosis control



M.P Brincat, R. Galea, Y. Muscat Baron: **Connective tissue changes in the menopause**- FIGO 94 Montreal. Int J. Of Gynecol-obst. 9/94

Measurements of collagen and its relevance for osteoporosis control

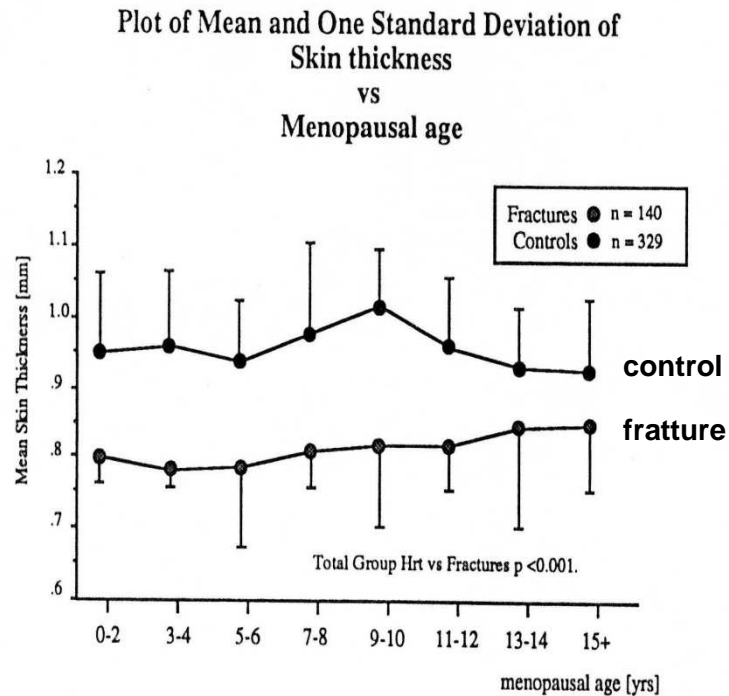
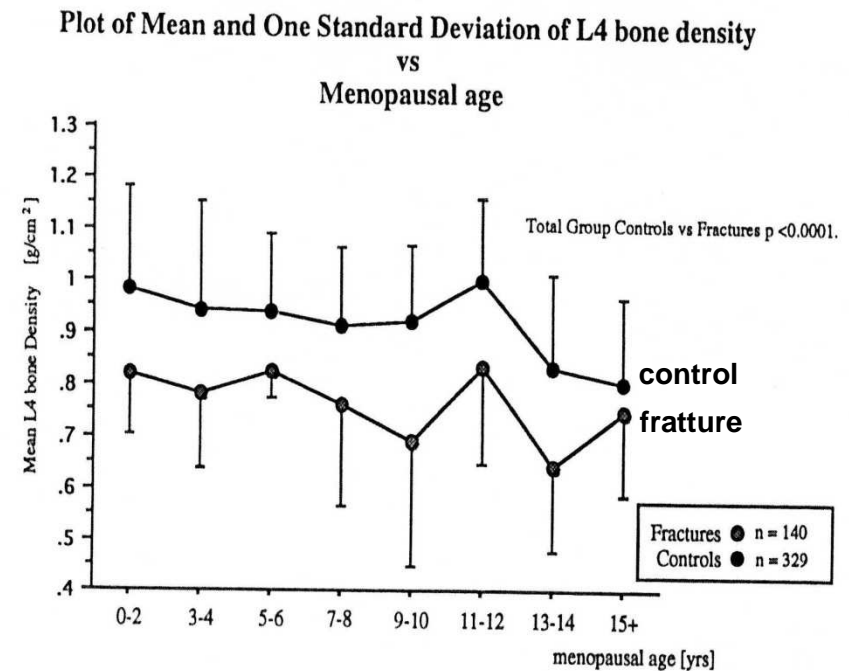


Figure 1



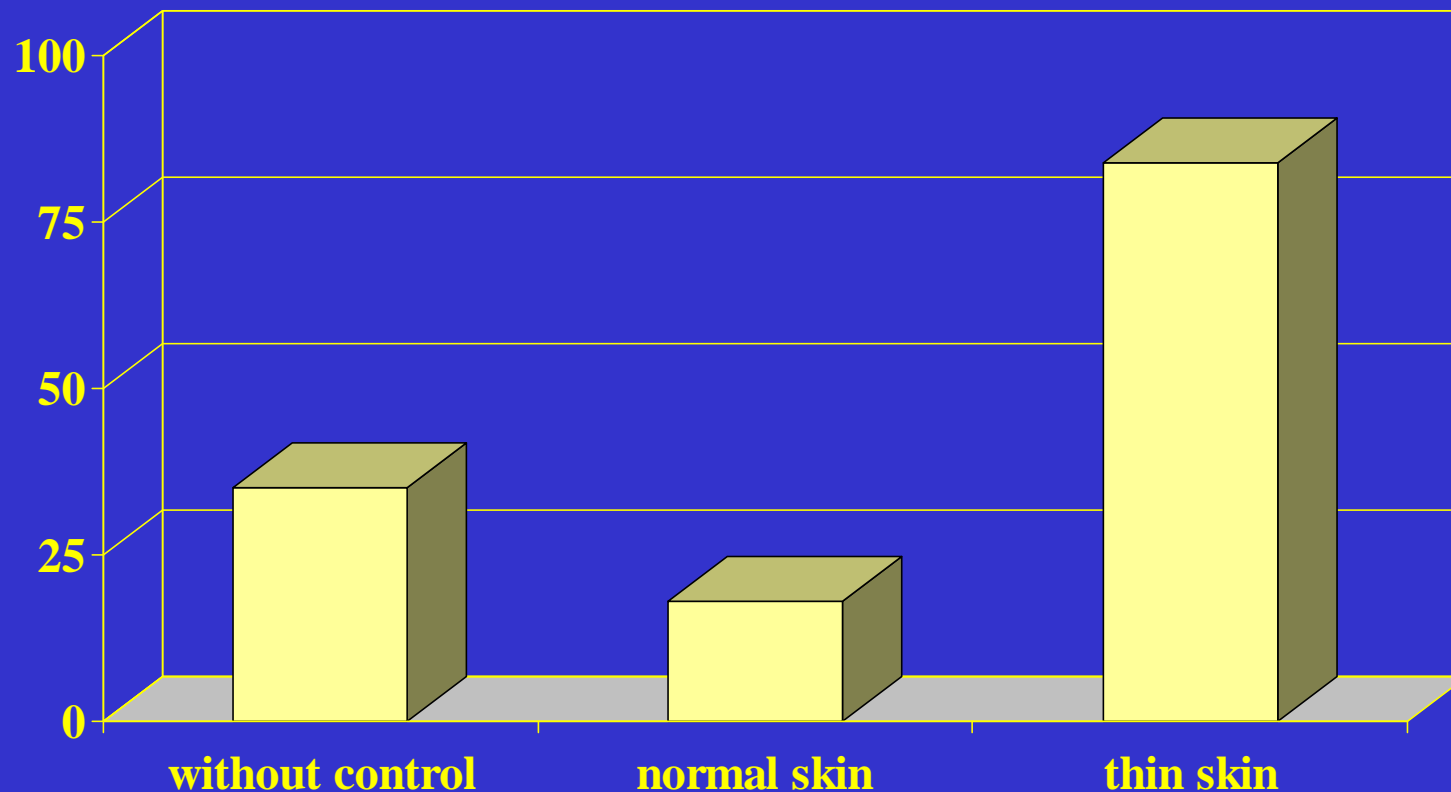
Baziad, A. et al., *Skin Thickness Measurement for early Detection of Osteoporosis in Menopausal Women with Transdermal Ultrasound*, 8th International Congress on the Menopause, Sydney, Australia, F035, (1996),

Milan, 2011

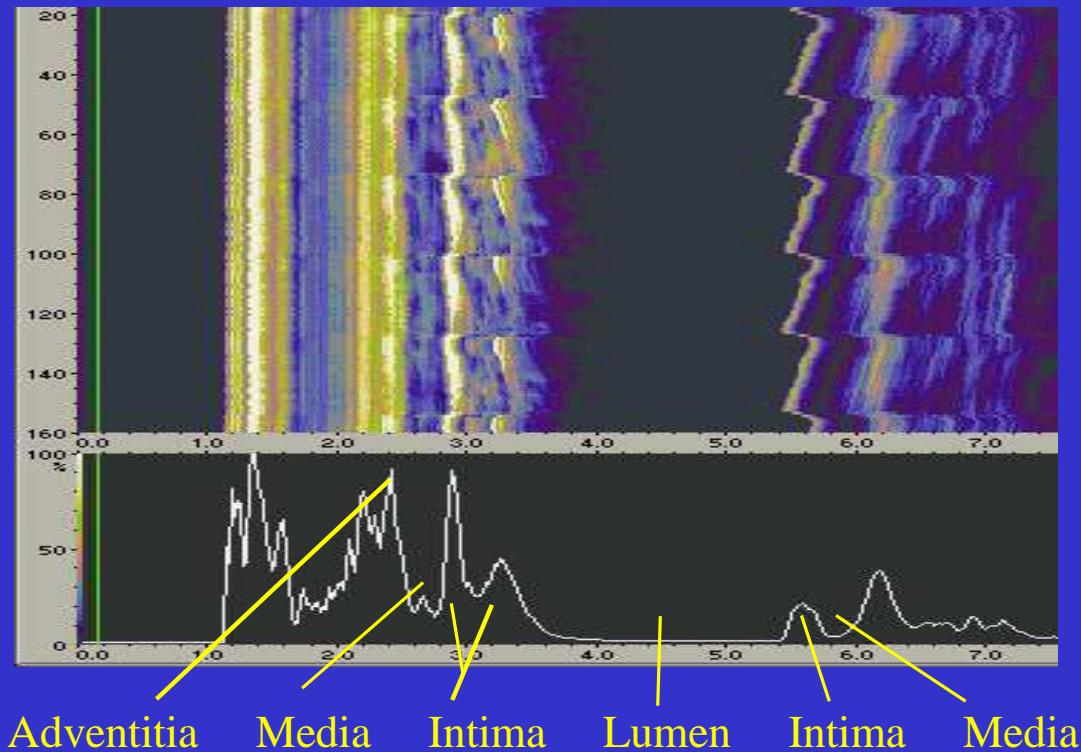
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Probability (%) to get a positive diagnosis of osteoporosis in relation to skin thickness (confirmed by DEXA and/or fracture)



Measurements of collagen and its relevance for cardio vascular diseases



Kenny A., Rodriguez-Macias, Lars Lind, Tord Neassen: *Thicker carotid intima and thinner media layer in subjects with cardiovascular diseases. An investigation using noninvasive high-frequency ultrasound.*-Atherosclerosis (2006)

Measurements of collagen and its relevance for cardio vascular diseases

Regression analysis of Carotid Intima vs Skin Thickness [Controls + HRT]

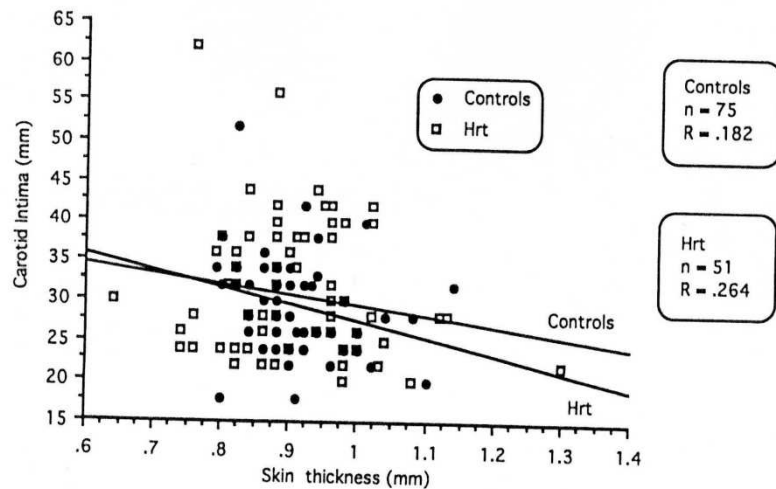


Figure 11

Regression analysis of Carotid Media vs Skin Thickness [Controls + HRT]

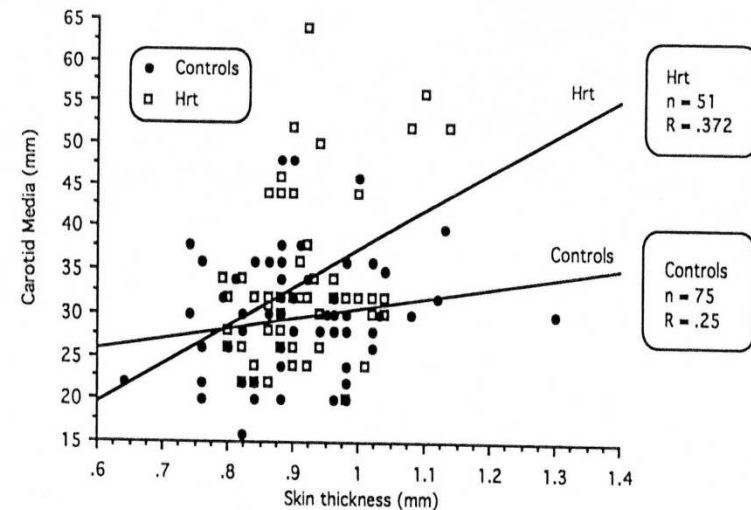
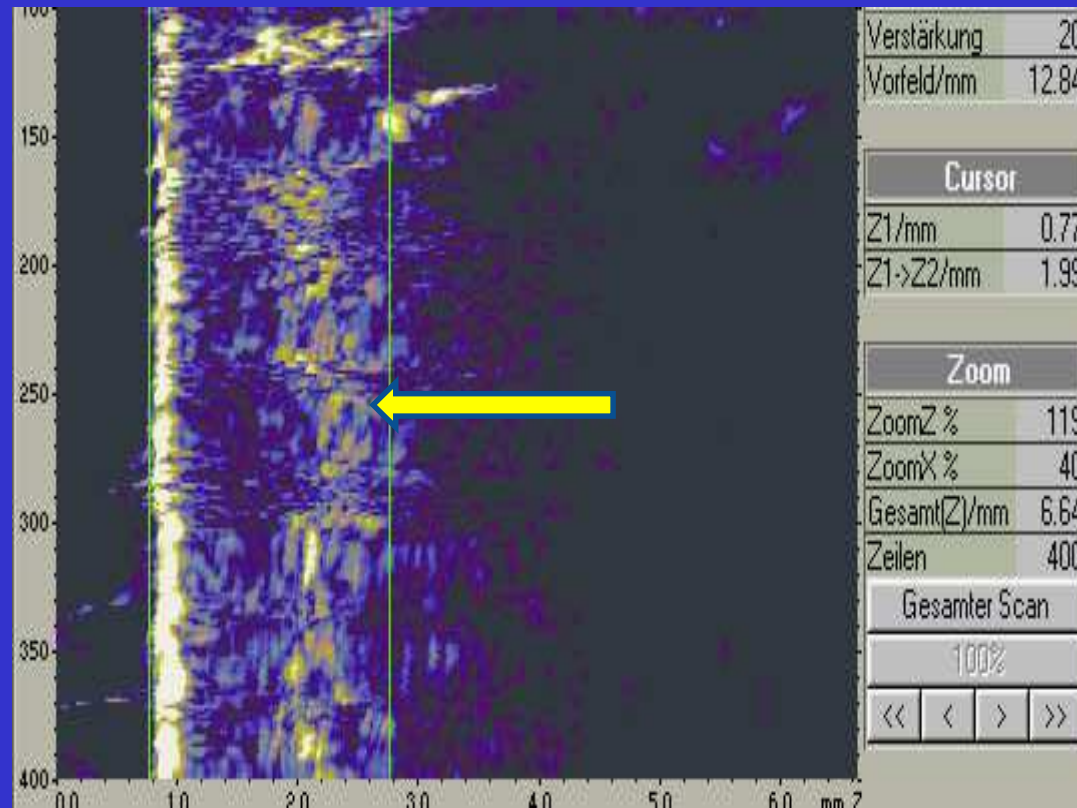


Figure 12

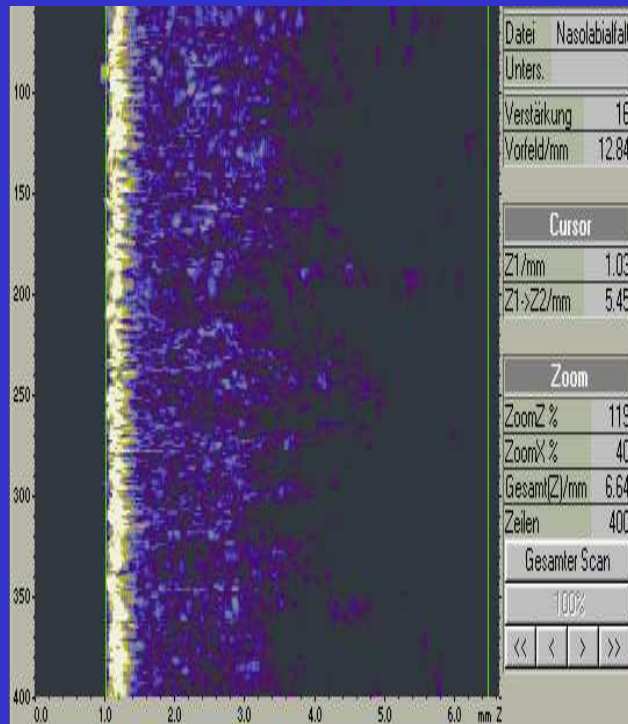
Kenny A., Rodriguez-Macias, Lars Lind, Tord Neassen: *Thicker carotid intima and thinner media layer in subjects with cardiovascular diseases. An investigation using noninvasive high-frequency ultrasound.*-Atherosclerosis (2006)

Infiltration with hyaluronic acid

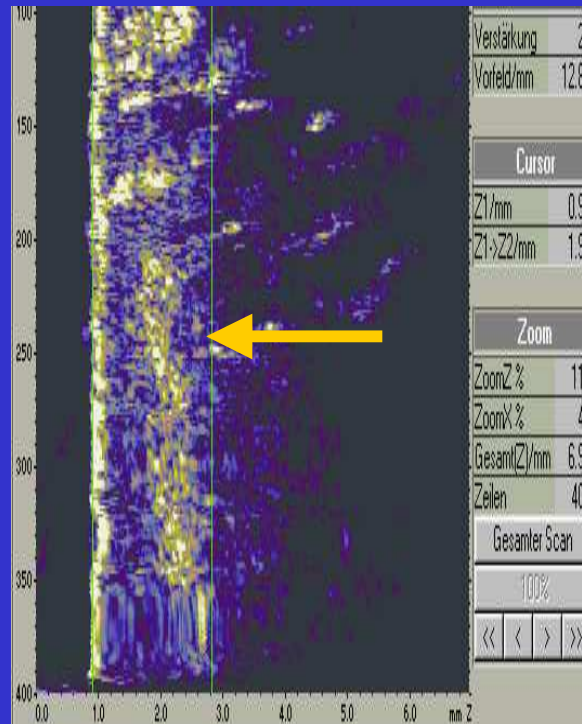


Nose-labial-fold

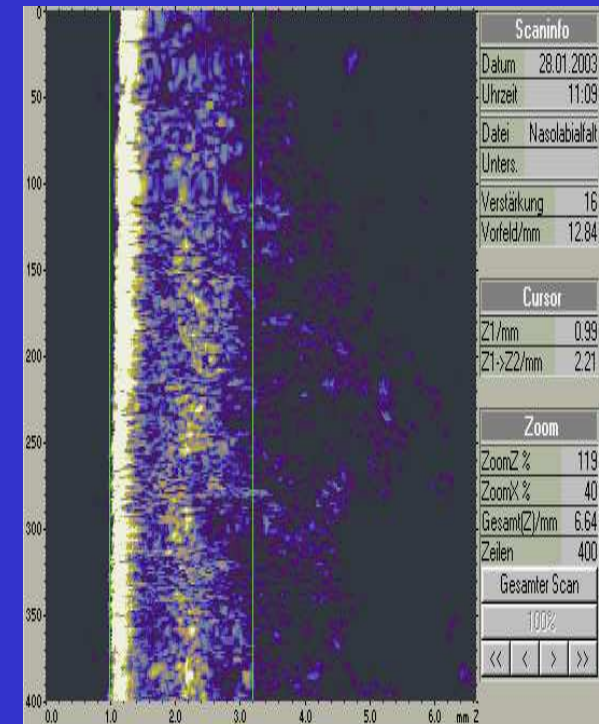
Infiltration with hyaluronic acid



before treatment

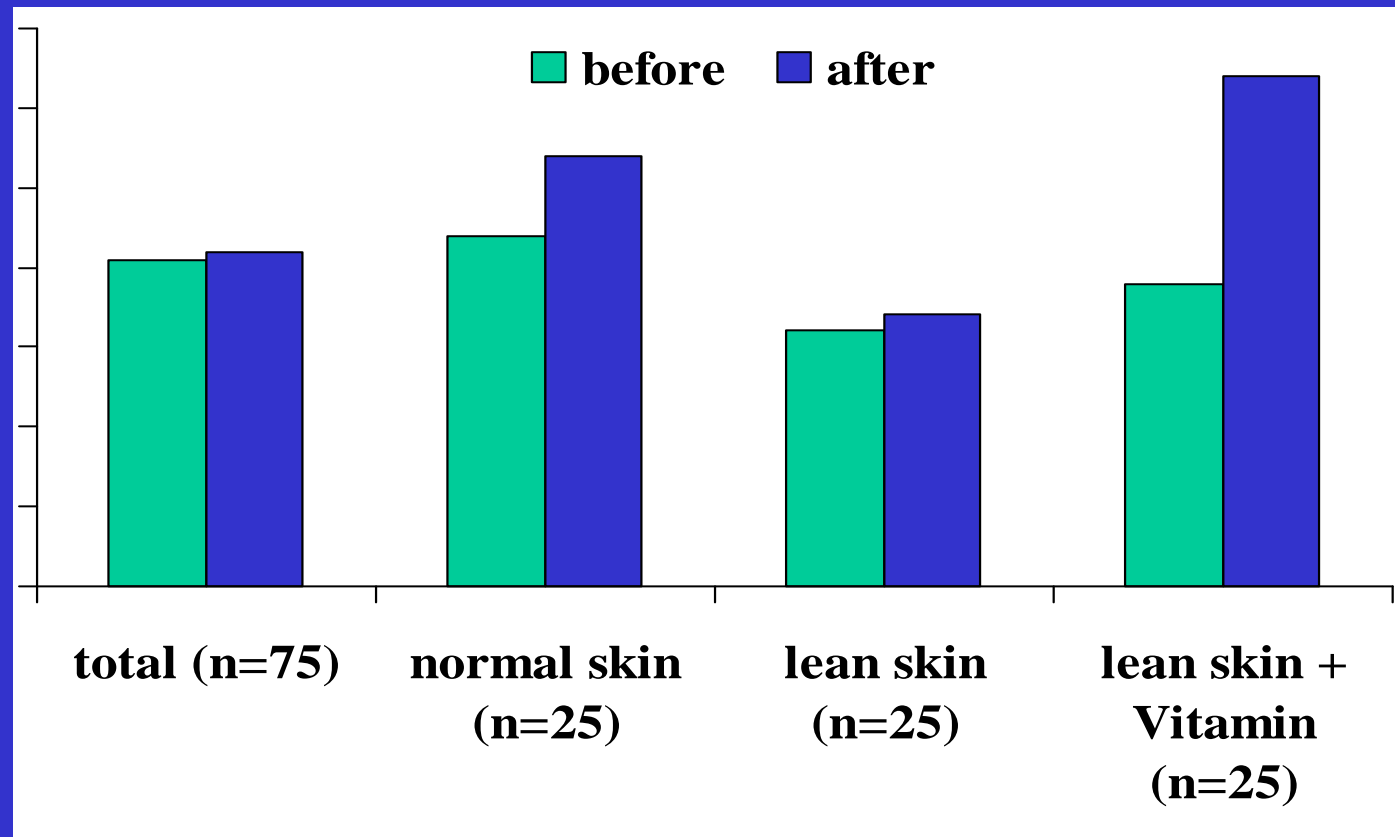


3rd week after treatment



8th week after treatment

Skin thickness before and after radio-frequency therapy in relation to the grade of nutrition (Heydecker et al. 2010)



Conclusions:

- The total amount of collagen within the skin decreases with age
- Such a decrease does not occur only within the skin, but sooner or later collagen will decrease even in other regions/organs, a fact that might cause and/or aggravate different diseases.
- Within the skin the total amount of collagen can be easily measured and quantified using a non-invasive, standardised high-frequency ultrasound system
- The total amount of collagen measured in the skin is related to the collagen amount e.g. within the bone and therefore with the risk of developing osteoporosis
- Using this high-frequency ultrasound system superficial vessels can be detected and their Media-Intima ratio can be measured and used as indicator for cardio-vascular diseases.
- Further studies might indicate additional possible fields of applications within preventive and anti-aging medicine.

Thank You for Your attention !



Any questions?

Info@[aesculapiusinternational.com](mailto:info@aesculapiusinternational.com)