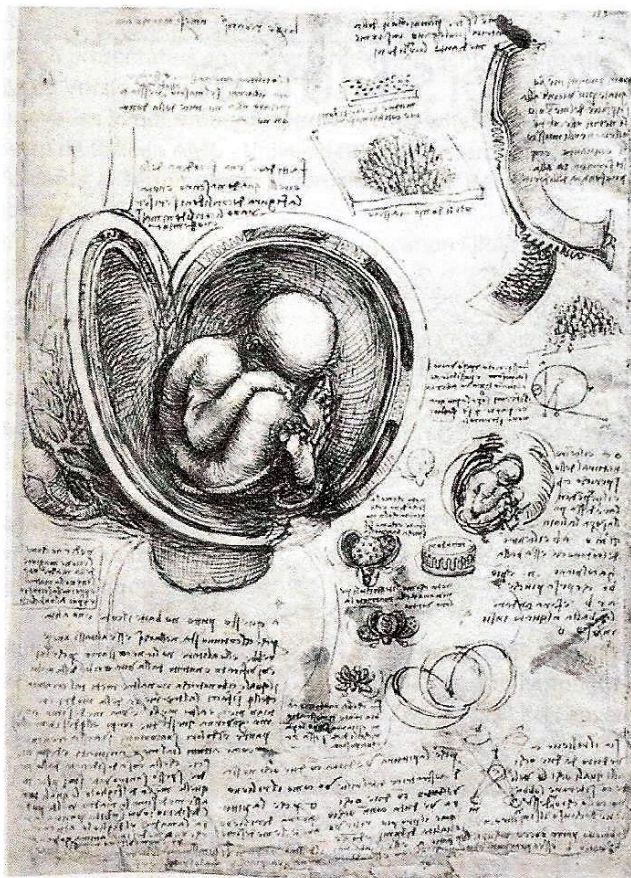




# NEDERLANDSE ANATOMEN VERENIGING

## 180<sup>STE</sup> WETENSCHAPPELIJKE VERGADERING



*Leonardo da Vinci – Embryological drawings of the Fetus (1510-1512)*

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## Forty years of finger high resolution imaging (1977-2017)

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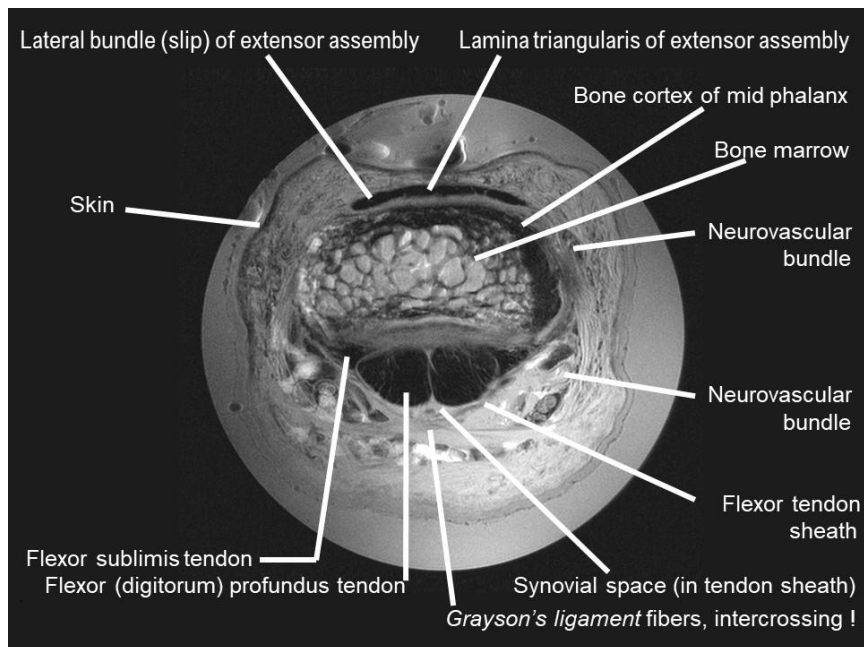
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### Abstract (extended version)

**Introduction.** In 1977 Mansfield and Maudsley published a cross-sectional image of the second phalanx of a human finger by Nuclear Magnetic Resonance (NMR), the first image by this method to reveal anatomical details in a living person (1). NMR spectroscopy was already used in chemistry (2) While their method broadened in scope exponentially, the seminal picture was treated in a somewhat stepmotherly fashion. Here we highlight some papers in which this image was repeated over the years

**Method.** We performed a bibliographic search for subsequent papers over the last forty years, in which high resolution-MR imaging of the second phalanx of the human finger was presented. We compared these results with those by our own group. Technical details of the latter were as follows. High resolution-MR imaging (HR-MRI) of a normal anatomical specimen of an extended right third finger was performed in three orthogonal planes by a Varian 400 spectrometer with a 9,4 T superconducting magnet. The field of view FOV (mm) in the transverse plane was 25 x 25 and with an imaging data matrix of 350 x 350, this resulted in a pixel resolution ( $\mu\text{m}$ ) of 71 x 71. Further acquisition parameters were: repetition time TR = 2500 ms; echo time TE = 18 ms; number of averages NA = 24; slice thickness 2 mm.

**Results.** In the last decade of the 20th century, the correlation of this specific MRI picture with anatomical specimens increased, mostly regarding musculoskeletal details. The first decade of the 21st century produced a more detailed matching with the neurovascular structures on either side of the finger. In the current decade finally, many details of the extensor assembly of the finger were represented as well (3).



**Discussion.** We illustrate these bibliographic findings with our own 2017 HR-MRI transversal slice (see Figure), after the 1977 image by Mansfield and Maudsley. Meanwhile, Sir Peter Mansfield (1933-2017) was awarded the 2003 Nobel Prize in Physiology or Medicine for discoveries concerning Magnetic Resonance Imaging.

### References

1. Mansfield P., Maudsley A. A. (1977) Medical imaging by NMR. *Br. J. Radiol.*, 50,188-194.
2. Altona C. (1996) Vicinal Coupling Constants and Conformation of Biomolecules. In: *Encyclopedia of NMR*, D. M. Grant, R. Morris, Eds. New York: Wiley, 4909-4923.
3. van Zwieten K. J. et al. (2017) Het normale proximale interphalangeale gewricht van de vinger. *N.T. Reumatol.*, 17, 3, 56-59.