limb excursions and longer strides etc. These adaptations are linked to a tendency for the hindlimb to over-stride the ipsilateral forelimb in order to avoid collision of the limbs. Such atypical hindlimb steps are often viewed as a negative outcome of primitive primate gait characteristics, but they may be functionally significant in some contexts. This study quantifies the tendency to over-stride and/or take bipedal steps in an arboreal context in three ateline species. Video data were collected on the unrestricted movements of wild *Alouatta seniculus, Lagothrix poeppigii,* and *Ateles belzebuth* during 11 months of observation in the rainforests of Ecuador. Video segments were analyzed frame-by-frame and atypical, hindlimb dominated stepping behaviors were quantified by dividing the total number of over-striding and arboreal bipedal steps taken by total locomotor bout time. *Ateles* locomotion involved significantly more instances of hindlimb over-striding and steps taken during arboreal bipedalism than either *Alouatta* or *Lagothrix*. Such atypical hindlimb dominated behaviors appeared to be associated with quick transitions between supports of different orientations or shifts to more orthograde locomotor modes. Like *Ateles,* apes have been reported to share a tendency to over-stride and patterns of force transmission emphasizing orthogrady. The findings for *Ateles* support a prediction that apes will also use over-striding in an arboreal context and provide evidence for an arboreal origin of transient but functional bipedal stepping.

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3D imaging and study of old fossils.

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Numerous prehistoric human remains were discovered in France between the end of the 19th and the first half of 20th century. They were often fragmented in situ or in accidental way and have been restored using different synthetic materials (i.e. resin, plaster) to replace the missing parts and painted with a brown varnish. The new methods of 3D imaging allow to remove and to join virtually all the pieces of these old puzzles to obtain new restitutions. We have studied two skulls. The first one is an adult skull that was discovered in Barma Grande cave, in Northern Italy, near France border in 1884. The other one is a skull of a 2-4 years old child, discovered in the cave of Rochereil, Dordogne, France in 1939.

The skulls were scanned in a Radiology Unit using a helical modulus with 1.25 mm thickness, 0.625 mm reconstruction. CT data were exported as DICOM files (512x512) and were postprocessed data using Mimics 9.0 (Materialise©). The virtual study of two fossil craniums made it possible to highlight which each cranium presented a great number of additions of synthetic material and many fragments was placed in a wrong positioning involving erroneous dimension. A virtual reconstitution of the two skulls is proposed. We thus consider that it is necessary to re-study systematically the human fossils discovered many years ago with CT analysis and virtual reconstitution before any morphometric analysis. The previous data concerning all the fossils restored with these old methods must be considered with caution.

The Neanderthal bony labyrinth reconsidered, introducing a new geometric morphometric approach.

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The bony labyrinth in the temporal bone houses the sensory systems of balance and hearing. While the overall structure of the semicircular canals and cochlea is similar across mammals, their detailed morphology varies even among closely related groups. As such the shape of the labyrinth carries valuable functional and phylogenetic information. Here we introduce a new, three-dimensional geometric morphometric (GM) approach to shape analysis of the labyrinth, as a major improvement upon previous studies based on linear measurements and angles.

After virtually extracting the bony labyrinth from CT scans of a temporal bone we computed its midline-skeleton by thinning the encased volume. On the resulting medial axes of the semicircular canals and cochlea we placed a sequence of semilandmarks. After Procrustes superimposition the shape coordinates were analyzed using multivariate statistics.

As a first exploratory application we compare Neanderthals to a geographically diverse sample of modern humans. Our results corroborate previously described shape differences between their bony labyrinths, but with an improved ability to discriminate between the two species. Because the geometric relationship among the point-coordinates is preserved throughout the analysis we are able to quantify and visualize even subtle shape differences, such as in the torsion of the canal arcs. Furthermore, we demonstrate how GM methods can be used to quantify the morphological integration of the labyrinth and the surrounding temporal bone.

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Low Magnification Microwear Analysis of Early Pliocene Cercopithecids from Gona, Ethiopia.

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