(Vallès-Penedès Basin, Catalonia, Spain): the holotype cranium of *Pierolapithecus catalaunicus* (IPS21350) from BCV1 (ca. 11.9 Ma); a maxilla of *Dryopithecus fontani* (IPS35026) from C3-Ae (ca. 11.8 Ma); and a maxilla of a new genus and species (IPS43000) from C3-Aj (ca. 11.9 Ma). RET was computed on the basis of several measurements (c: enamel cap area; e: length of the enamel-dentine junction; and b: dentine area), taken from CT-scan sections through the mesial cusps of upper molars (except in two cases, where distal sections were used for preservational reasons). Martin's formula was employed: RET = (c/e)/(b^0.5)*100. The following results were obtained (mean and range): 19.5 (17.3-21.8) in *Pierolapithecus* (N=6, SD=1.7); 15.5 (14.1-16.2) in *D. fontani* (N=4, SD=1.0); and 18.6 (16.7-20.6) in the new genus (N=5, SD=1.5). The ACM apes thus share a relatively thick-enameled condition, as opposed to the thinner-enameled extant African apes. Like other Middle Miocene Eurasian taxa (the kenyapithecin *Griphopithecus* and the pongine *Sivapithecus*), *Pierolapithecus* and the new genus display considerably thick enamel, while *Dryopithecus* is somewhat thinner-enameled, more closely approaching orangutans. In the latter, thick enamel has been related to the consumption of relatively tough and hard foot items. As such, the similar (or even thicker-enameled) condition of Middle Miocene Eurasian hominoids is probably indicative of sclerocarpic harvesting, either habitually or seasonally (as fallback foods). The thick-enameled condition of the ACM hominids is consistent with a kenyapithecin-hominid sister-taxon relationship, and also with previous assertions that thick enamel might have been the fundamental adaptation that enabled the out-of-Africa dispersal of large-bodied hominoids and its subsequent initial radiation throughout Eurasia.

Poster Session III, (Friday)

UPDATING DINOSAUR RECORD FROM TERUEL (ARAGON, SPAIN)

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Teruel pioneered the Spanish dinosaur research, including the first new genus ever described in Spain, and recent fossil discoveries are now interesting not only for paleontologists, but also for regional heritage institutions and visitors to Dinópolis. Most findings are placed in Tithonian to Albian age continental sediments. Villar del Arzobispo Fm (Tithonian-Berriasian) is one of the richest in dinosaurs. Ichnites of stegosaurs, ornithopods, big-sized sauropods and theropods are abundant in limestones (El Castellar, Cedrillas, Formiche) but more scarce in lime-sandy facies (Galve). Milestones in this Formation include a giant sauropod partial skeleton and a huge theropod tooth from Riodeva, (and 50 new dinosaur sites there). The giant *Turiasaurus* represents the basal eusauropod clade Turiasauria (reasonably identified in Portugal, France, UK, and, possibly, in Africa). We also recovered there diplodocids, stegosaurids (*Dacentrurus*), ornithopods and theropods (Allosauroidea and others small-sized). In El Castellar there are 8 new sites with footprints -highlighting stegosaurs- and 13 with bones. Upper Hauterivian-Lower Barremian alluvial Castellar Fm includes dinosaurs in its lower part: El Castellar (20 sites) -with *Oplosaurus*- and Miravete (7 sites). Same age deposits in Cantavieja (Mirambel Fm) have yielded a muzzle of a small theropod. Lower Barremian red clays and white sands from Camarillas Fm record tridactyl trackways in El Castellar and bones in Gúdar and Maestrazgo Geopark (Iguanodontoidea in Aliaga). Upper Barremian–Lower Aptian red/grey marls and bioclastic sandstones in Miravete include some scarce dinosaur remains. The Aptian sauropod *Tastavinsaurus* has recently been proposed as belonging to a new clade: Laurasiformes. Finally, dark grey marls from Aptian Forcall Fm. in El Castellar yielded a new partial Macronaria skeleton. Thus, in the last 6 years, 100 bone and 18 ichnite new sites came to light. Many fossils are still in study and they would complete the Mesozoic scenario in this part of the Iberian Range.

Poster Session III, (Friday)

AN IMPORTANT NEW LOWER JURASSIC ICHNOFAUNA FROM THE NAVAJO-NUGGET SANDSTONE OF IDAHO

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Vertebrate tracks from the Navajo Sandstone and its equivalents are rare north of the I 70 corridor that runs east-west through Colorado and Utah. We herein report an important new ichnofauna from the Bear Lake region of Idaho that reveals abundant, well-preserved dinosaur, synapsid and invertebrate traces. Small (4-5 cm long), *Grallator*-like, tridactyl dinosaur tracks represent diminutive theropods (hip height ~18-22 cm). Abundant small (pes length 0.5-5.0 cm) tetradactyl-pentadactyl tracks (cf. *Brasilichnium*) of quadrupedal track makers with moderate to strong heteropody represent a variety of mammaloid or synapsid trackmakers. Enigmatic moderate- to large- sized (>5 cm), tetradactyl tracks (cf. *Batrachopus* and *Navahopus*) may represent prosauropods, other archosaurs or synapsids. Tracks of large spiders (ichnogenus *Octopodichnus*) are also abundant, and indicate a wide range of sizes and gaits. The presence of the shallow-burrowing insect trace, *Entradichnus* is consistent with an arid landscape, with low vegetation and intermittant precipitation. The Bear Lake locality is the most northerly occurrence of tracks in the Navajo-Nugget Sandstone and the first confirmed report from the state of Idaho. The ichnofauna reveals the greatest variety and size range of well-preserved mammaloid (synapsid) tracks yet reported, and together with the Meeker locality in Colorado has the best sample of large spider tracks and other invertebrate traces. Spider tracks are also known from a third locality north of I 70 but have not been reported to the south. The ichnofauna is an important window into the northern expression of the eolian ecosystem in Navajo times and represents an excellent example of what has variously been labeled as the *Chelichnus* (=*Laoporus*), *Chelichnus-Octopodichnus* or *Brasilichnium* ichnofacies, which has multiple expressions (ichnocoenoses) in eolian facies especially in the Permian through Jurassic.

Technical Session XV, Saturday 9:30

THE EVOLUTION OF HINDLIMB MUSCLE MOMENT ARMS AND FUNCTIONAL ANATOMY IN BIRD-LINE THEROPOD DINOSAURS

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Computer models of theropod dinosaur hindlimbs based on skeletal anatomy and extant soft tissues allow quantified estimation of 3D moment arms (leverage) that may not be directly determined by simple observation and measurement of the fossils themselves. Based on 3D models of 10 representative taxa, we present an analysis of the evolution of moment arms in theropod dinosaurs along the evolutionary lineage of modern birds, normalized to remove size biases.

The results concur with previous findings in that most dinosaur hip muscles were multifunctional, with relatively few muscles highly specialized to rotating the hip in a single degree-of-freedom. Many muscles, particularly those originating close to the acetabulum, were found to switch moment arm polarity dependant on joint angles – muscles of the adductor group, hamstrings and iliotibialis group in particular were found to be capable of both limb retraction and protraction at different points in the limb's arc. Muscles crossing the knee, ankle and more distal joints were found to be more stereotyped in their function. Trends observed in our sample support some previous hypotheses about the evolution of limb use in bird-line Dinosauria; expansion of the ilium and proximal ischium and pubis is correlated with increasing limb flexion/extension moment arms of associated muscles and expansion of the cnemial crests was found to correlate with increased knee extension leverage. Contrary to previous estimates hip extension leverage of the adductor group were not found to increase. Although previous estimates of the expansion of femoral medial rotation leverage correlated to expansion of the trochanteric crest were well supported, a potential concomitant reduction of the femoral lateral rotation leverage of the caudofemoral muscles was found. We theorize that the caudofemoral muscles of earlier theropods acted as a major lateral rotator antagonist to the medial rotator iliotrochantericus group and may have hindered stance-phase balancing by medial rotation, which may be a factor in the reduction of the caudofemoral group muscles along the bird-line.

Technical Session IV, Wednesday 4:00

***PIEROLAPITHECUS*, *HISPANOPITHECUS* AND THE EVOLUTION OF POSITIONAL BEHAVIOR IN MIOCENE APES: PERSPECTIVES FROM THE HAND**

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The *Pierolapithecus* partial skeleton (ca. 11.9 Ma) constitutes the earliest record of an unequivocal orthograde body plan in hominoid evolution, thus providing a unique opportunity for understanding the changes in hand anatomy that occurred during the pronogrady/orthogrady transition. We describe the *Pierolapithecus* manual phalanges and compare their morphology and proportions with those of other Miocene apes, in order to make locomotor inferences. In particular, we test whether the acquisition of vertical climbing and suspension was decoupled during evolution. Our results indicate that Miocene apes primitively retain phalangeal features related to powerful-grasping palmigrady, thus suggesting that above-branch quadrupedalism, inherited from stem hominoids, constituted a significant component of the locomotor repertories of several hominoid lineages at least until the Late Miocene. Nonetheless, some Miocene apes do significantly differ regarding phalangeal curvature and/or elongation. The Late Miocene *Hispanopithecus* (ca. 9.5 Ma) departs by displaying, like orangutans, highly-curved and elongated phalanges, which together with other features are indicative of orang-like suspensory capabilities. On the contrary, the remaining Miocene apes display low to moderate phalangeal curvature and elongation, which are indicative of the lack of suspensory adaptations. As such, the transition from a pronograde towards an orthograde bodyplan, as documented by *Pierolapithecus*, is functionally related to enhanced vertical-climbing capabilities, but decoupled from the acquisition of suspensory adaptations (not found until *Hispanopithecus*). Our results thus agree with the view that hominoid locomotor evolution took place in a mosaic fashion: just like taillessness antedated the acquisition of orthogrady, the latter preceded the acquisition of suspensory adaptations as well as the loss of primitively-retained, palmigrade features. This combination of primitive and derived traits in fossil apes, unexpected based on extant taxa alone, should warn us against inferring the positional behavior of extinct taxa on the basis of single morphological traits from single anatomical regions.