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THE CHAÑARES (ARGENTINA) TRIASSIC REPTILE FAUNA. XVII. THE CHANARES GOMPHODONTS

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ABSTRACT. Much of the gomphodont material in the Chañares collections appears to pertain to two closely related but distinct species, *Massetognathus pascuali* and *Massetognathus teruggii*. An especially large skull is described as *Massetognathus major*, sp. nov. Two skulls represent a distinct form, *Megagomphodon oligodens*, gen. et sp. nov., differing mainly in its smaller but more numerous cheek teeth.

As noted previously, a large proportion of the reptilian remains from the Chañares beds pertain to the peculiar gomphodont side branch of the Cynodontia, abundant in all Middle Triassic terrestrial faunas. Although much of the 1964–65 collection from these beds was, because of political complications, long delayed in shipment, the one box that reached the laboratory promptly contained a number of gomphodont skulls, on the basis of which I described two species as *Massetognathus pascuali* and *Massetognathus teruggii* (Romer, 1967). The skull materials then available sorted out clearly into two size groups, differing in skull length by about 40 percent. This figure was too great to be due to sex differences, and since there were in this sample of the collection no intermediates in size between the two groups, erection of two species seemed fully justified.

Today, with the full collection available, a much larger array of gomphodont skull material lies before me, and a re-study of the situation is called for. In many instances in vertebrate paleontology, specific diagnoses have been made on supposed size differences when only a few specimens were known, only to be proved invalid when more abundant material became available. Might that not be the case here? Two large specimens prove to be of a distinct type (described below) but most appear to pertain to *Massetognathus* and show a wide variation in

size. They are here tabulated according to skull length measured to the condyles. Owing to imperfections in the material or incomplete preparation, this measurement was available only in a fraction of the cranial specimens, but in a number of other cases this basal length could be calculated fairly accurately from other measurements.

Table I. *Massetognathus* CRANIAL SPECIMENS GROUPED BY BASAL LENGTH, IN MM.

61– 70 mm	1
71– 80 mm	11
81– 90 mm	16
91–100 mm	13
101–110 mm	8
111–120 mm	6
121–130 mm	4
131–140 mm	5
141–150 mm	2
151–160 mm	1
161–170 mm	4
200–210 mm	1

In any population of living reptiles or any adequate sample of a fossil form, the size distribution is a characteristic one; the great proportion of the specimens represent young adults, but in addition there are present a few forms of somewhat greater size, presumably older individuals in which further growth had occurred. To some degree our distribution is of the type that suggests a single species, with the greater part of the specimens concentrated in the size range attributed in my earlier paper to *M. pascuali*, the holotype skull of which measured 87 mm in length. But in two regards the collection does not agree with the assumption that we are dealing with a single species. (1) In a typical one-species population only a very few "elderly" individuals are present far above the "young adult" size; here nearly half of the specimens extend onward toward sizes far exceeding that of the young adults. (2) Even excluding the single extra-large skull tabulated, these larger specimens run upward to a skull size about double that of "young adults" of *M. pascuali* — a situation quite out of the range of possibility of size increase in any known reptile population. It seems certain that in these larger specimens we are dealing with representatives of a second species, *M. teruggii*, less abundant than

M. pascuali, but of larger size — the holotype skull of *M. teruggii* measuring 125 mm in basal length.

Confirmation of this conclusion is given by a consideration of the "molar" dentition. In many cases the lower jaws are firmly occluded with the upper, so that (in default of difficult preparation) the tooth surfaces are not clearly seen. However, the "molars" are visible in surface view in a number of specimens of both the smaller, *M. pascuali*, and of the larger, *M. teruggii*, types. In the *M. pascuali* specimens the typical "molars" have an anteroposterior width which averages close to 3 mm; those of *M. teruggii* average 3.75 mm. Further, Mr. John Hillman, who has studied gomphodont dentitions intensively, pointed out to me that in the *teruggii* specimens the "molars" are also proportionately broader mediolaterally than in the smaller *M. pascuali* specimens.

It is highly improbable that this increase in individual molar size could occur during the lifetime of an individual. There is almost no evidence of any vertical replacement of these very deep-rooted teeth in the adult. There is evidence here, as in other gomphodonts, of a trend for suppression of one or two of the smaller anterior "molars" during the lifetime of an individual, and for the addition of one or more teeth at the posterior end of the series. But there is no indication of development of the complex type of tooth replacement found in the manatee, by which a whole series of "molars" might be replaced by larger successors pushing forward from the back end of the series. If such replacement were to occur, we would expect the new teeth added at the back of the series to increase in size. For the most part the "molars" in the back part of the series are larger than those anteriorly placed. But Mr. Hillman, who has made careful measurements of the *Massetognathus* dentitions, tells me that in a number of instances the last one or two teeth in the series are smaller, rather than larger, than those anterior to them.

Apart from the two species of *Massetognathus* discussed above, the Chañares gomphodont series certainly includes other variants. As discussed below, two specimens appear to represent a form generically distinct from *Massetognathus*. And in addition, the specimens assigned to that genus are quite surely not all assignable to *M. pascuali* and *M. teruggii*. As mentioned above, the *M. teruggii* type has a skull length of 125 mm. We would reasonably expect a number of older individuals to exceed this figure to a modest degree, up to about 160 mm or so — that is,

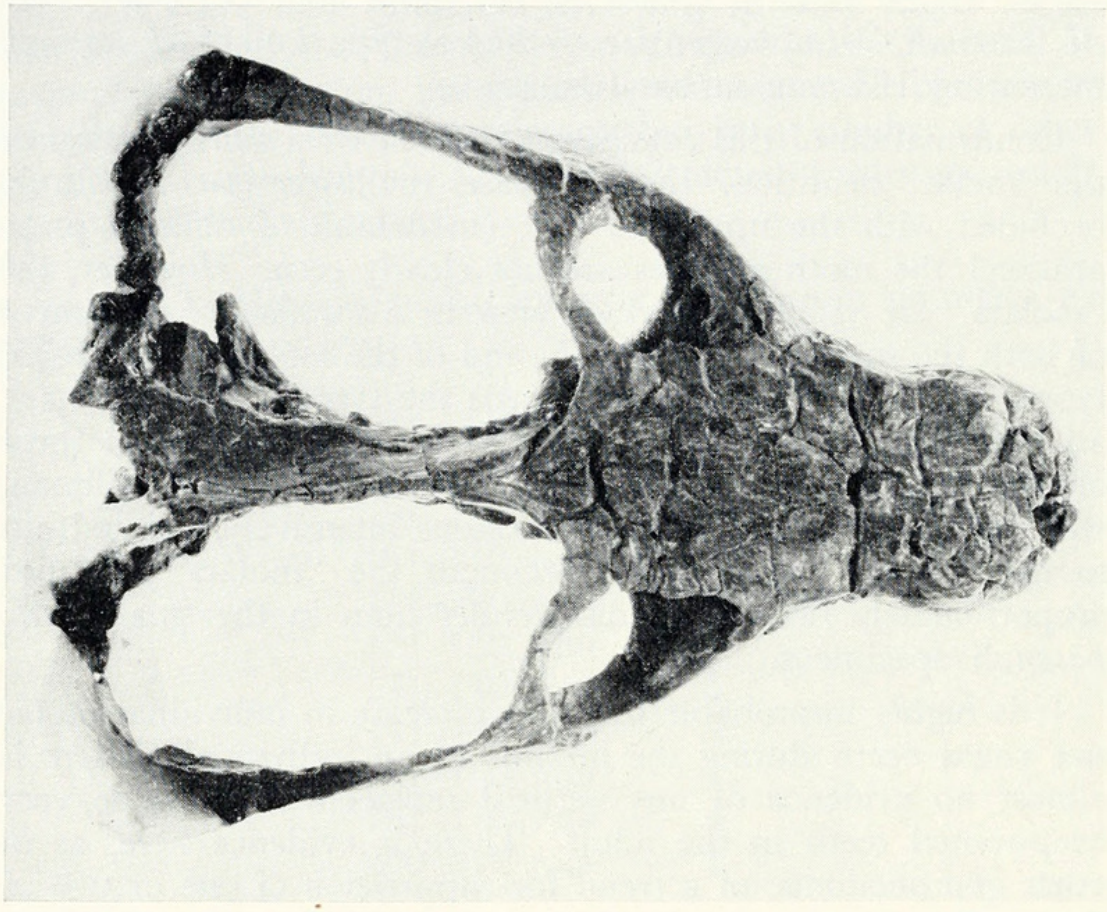

Figure 1. The holotype skull of *Massetognathus major* in dorsal view. × 2/5.

to a skull length of as much as 30 percent in excess of a "young adult." But the finding of four specimens in the 160–170 mm bracket is disturbing, and a skull of over 200 mm in length — two-thirds again as large as the type — gives us an impossible situation. We have here, quite certainly, a third, large species.

Massetognathus major sp. nov.

Holotype: La Plata Museum, No. 64-XI-14-15, (field no. 55). From the Chañares formation, about 4 km southeast of the mouth of the Rio Chañares, La Rioja Province, Argentina.

Diagnosis. Generally comparable to other species of *Massetognathus*, but orbits extend relatively far forward, antorbital region narrower than in other species; cheek tooth rows less divergent posteriorly; size large, the holotype with a basilar skull length of 205 mm.

The species is based primarily on a single skull (Figs. 1, 2) far larger than any other assigned to this genus. The specimen

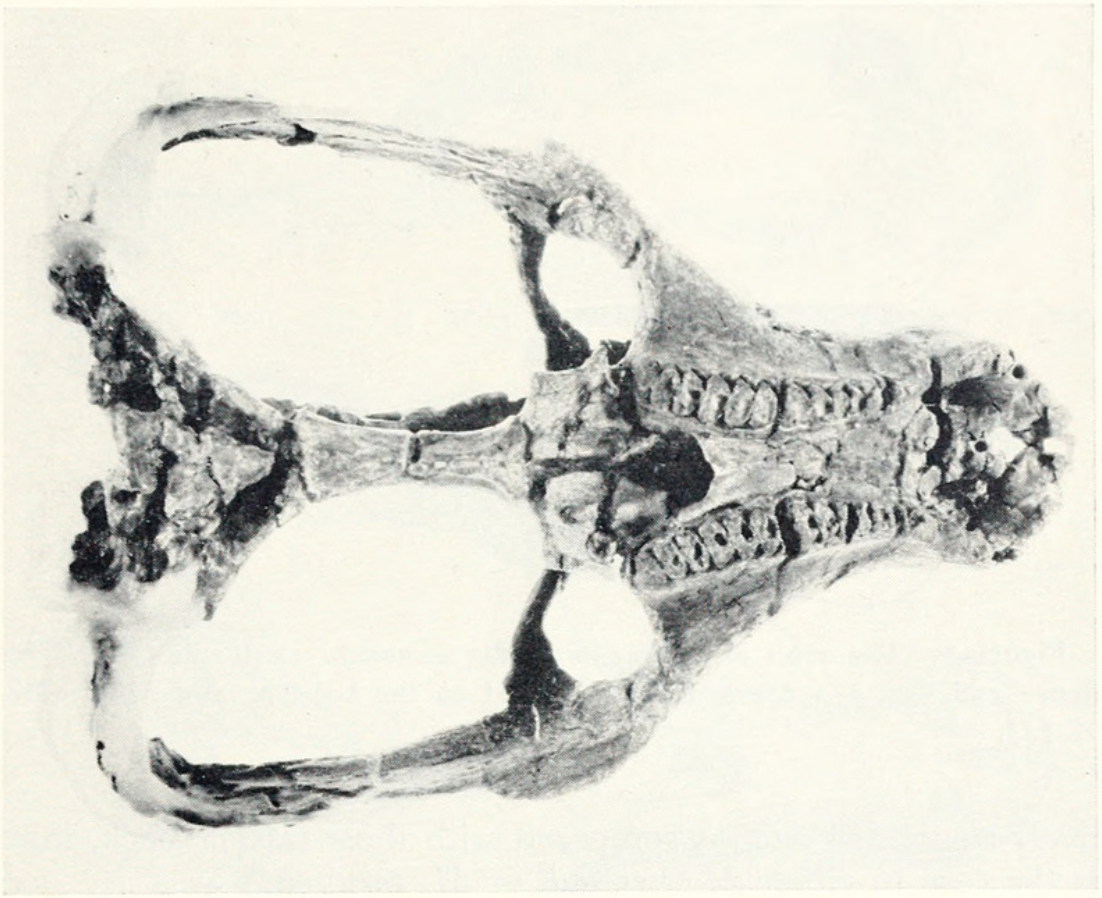

Figure 2. The holotype skull of *Massetognathus major* in ventral view. × 2/5.

was found exposed with the palatal surfaces upward, and in a somewhat weathered condition, so that the cheek teeth do not show the crown pattern well, and the posterior part of the skull is imperfectly preserved. In most regards the skull agrees well with the previously described species of *Massetognathus*. Distinctive, however, is the relative narrowness of the snout and a consequently lesser development of the broad shelf which, in ventral view, extends far out on either side of the cheek tooth series. The series of cheek teeth are but little curved, and diverge but little posteriorly. The orbits, instead of being essentially subcircular in outline, extend forward in triangular fashion, with the apex of the triangle lying at the entrance to the lacrimal duct. In relation, presumably, to large size, the sagittal crest is well developed, the ridges bounding the temporal openings fusing medially a short distance back of the postorbital bar, with complete obliteration of the parietal foramen. Thirteen cheek teeth are present on either maxilla; the most anterior are rela-

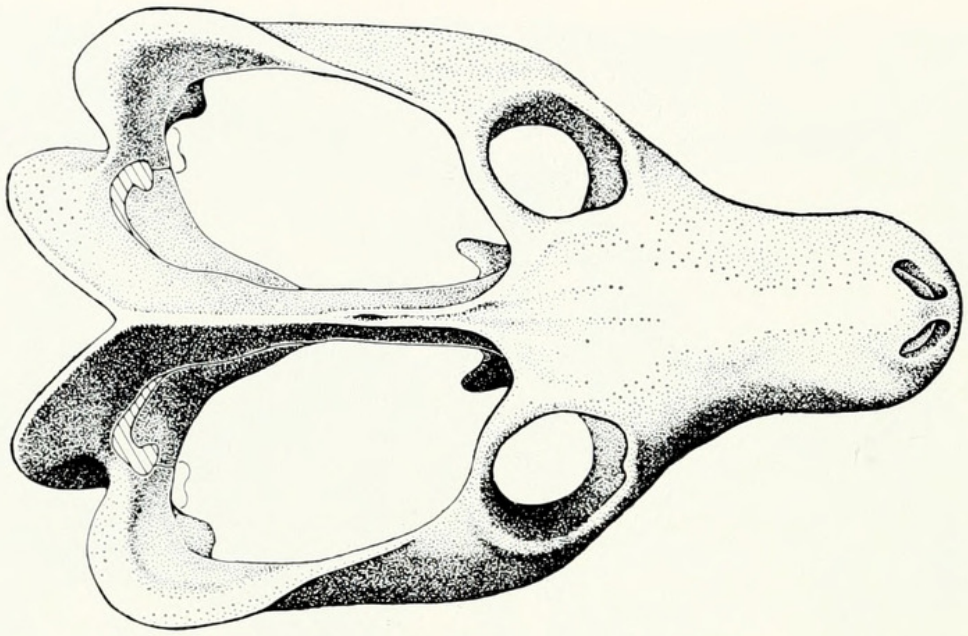

Figure 3. The skull of *Megagomphodon oligodens* in dorsal view. This figure and figs. 4–6 are composites, based on the holotype and MCZ 4138. × 2/5.

tively smaller in size, as compared with those farther back, than is the case in either *M. pascuali* or *M. teruggii*.

Megagomphodon oligodens gen. et sp. nov.

Holotype: La Plata Museum No. 64-XI-14-16, (field no. 65). Chañares formation, La Rioja Province, about 6 km ENE of the mouth of the Rio Chañares.

Diagnosis. A relatively large traversodontid gomphodont, with a basal skull length on the order of 180 mm. Cheek teeth relatively small, especially anteriorly, and about 17–18 in number. Skull relatively slender, the width across the orbital region being but about two thirds the total skull length.

In the collection two skulls, the holotype and MCZ 4138, represent a gomphodont type clearly distinct from *Massetognathus*. Incomplete jaws, but no postcranial materials, are associated with both. Neither is too well preserved; the holotype has fairly well preserved cheek teeth, but is imperfect posteriorly; the posterior part of the braincase is preserved in MCZ 4138, but teeth are represented only by their roots. My description is based on a combination of features present in one skull or the other, and my illustrations (Figs. 3–5) are likewise composite. On neither skull are the sutures well shown, and I have in consequence omitted most of them in my figures.

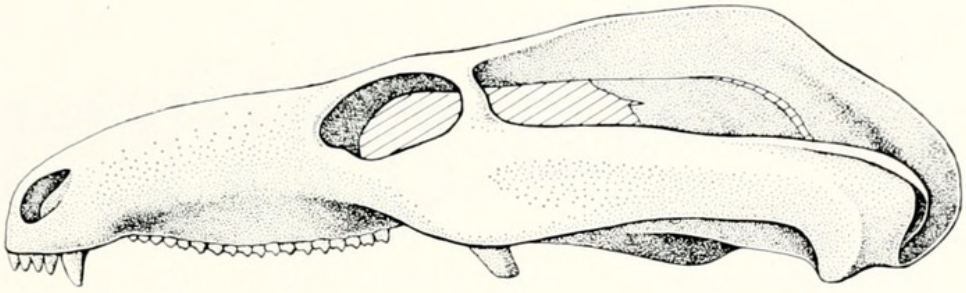

Figure 4. The skull of *Megagomphodon oligodens* in lateral view. × 2/5.

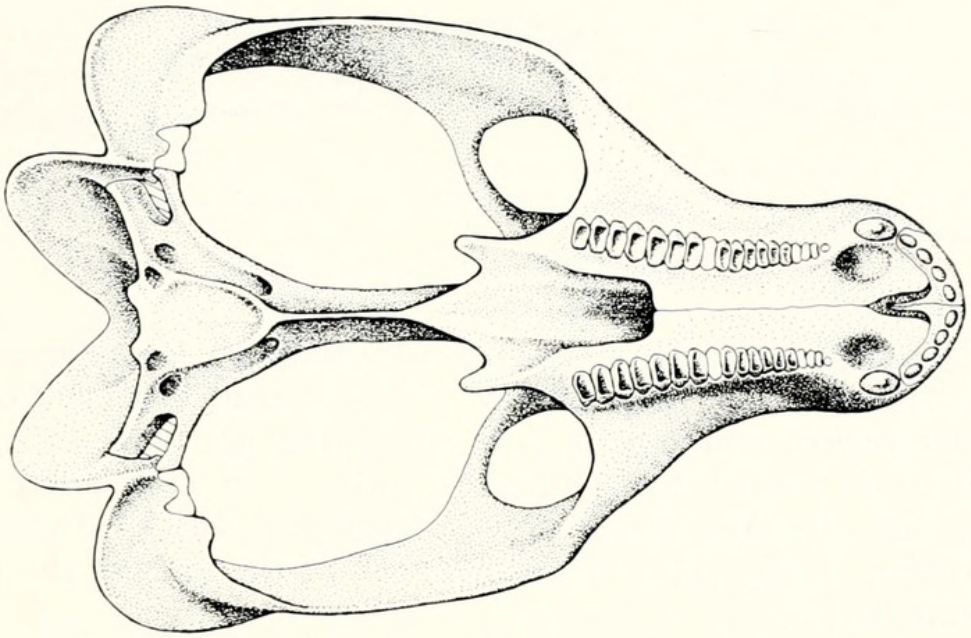

Figure 5. The skull of *Megagomphodon oligodens* in ventral view. × 2/5.

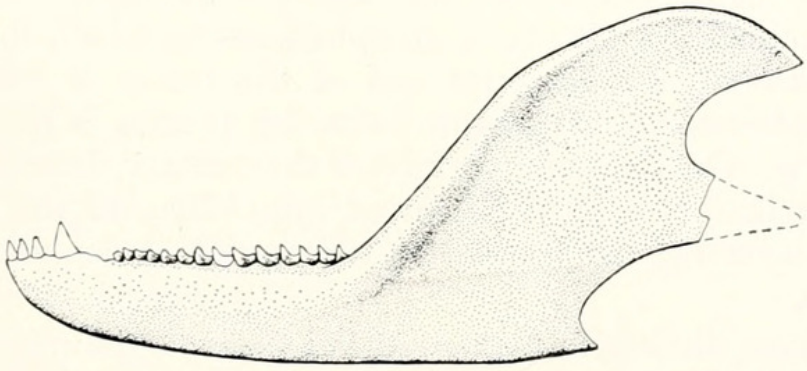

Figure 6. The dentary of *Megagomphodon oligodens* in lateral view. × 2/5.

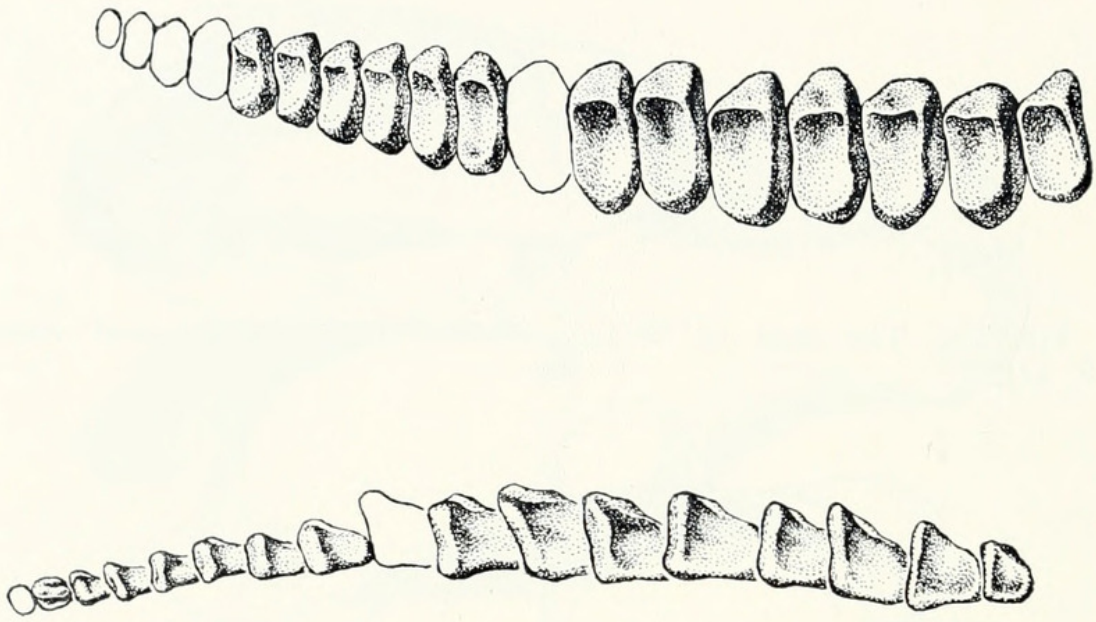

Figure 7. Left upper and lower cheek teeth of *Megagomphodon oligodens*. × 3/2.

The skull is somewht more slender than in *Massetognathus*. The "muzzle" is notably narrow, with a constriction back of the canine region, and expansion in width does not take place until well back toward the subcircular orbits. In correlation with large size, the sagittal crest is well developed, with the two crests becoming closely apposed not far back of the level of the postorbital bar.

Dentaries are preserved in both specimens (Fig. 6). The "angular" region is well developed, and in MCZ 4138 has a backwardly pointed tip. As in all traversodonts the ascending ramus is highly developed, and extends far back dorsally. In most specimens of Chañares gomphodonts in which the bone is well preserved, the posterior end of the ramus is rounded; in both specimens of the present form this process is sharp-tipped posteriorly. On the inner surface of the dentary there is a longitudinal recess, typical of advanced cynodonts, for the reception of the supporting bar formed by surangular + angular + prearticular.

The most distinctive feature of this genus is the nature of the cheek teeth (Figs. 5, 7). These are numerous, and in the holotype, where the dentition is nearly completely preserved, there appear to be 17 or 18 "molars" in both upper and lower jaws. This is, of course, a definitely higher count than in *Massetognathus*. On the other hand, the individual teeth are definitely

smaller than in that genus. The length of the entire row of upper cheek teeth is about a third of the skull length in this form and in *Massetognathus* as well; but since the number of teeth in *Megagomphodon* is greater, the anteroposterior dimensions of individual teeth is relatively small; the average anteroposterior length of an individual tooth in *Massetognathus* is about 3 percent of the skull length, in *Megagomphodon* only about 2 percent. The *Megagomphodon* teeth are also relatively small in transverse measurement; the broadest teeth in this genus measure only about 4 percent of skull length, whereas this width in *Massetognathus* is approximately 5 percent.

Except for the reduced tooth size, *Megagomphodon* is obviously not distantly related to *Massetognathus* and this genus may perhaps have been derived from such a form as *M. major*.

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ROMER, A. S. 1967. The Chañares (Argentina) Triassic reptile fauna. III. Two new gomphodonts, *Massetognathus pascuali* and *M. teruggii*. Breviora, Mus. Comp. Zool., No. 264: 1–25.