Summary. Archaeological examples of violence in prehistory have increased in recent years. The evidence, methodology employed and interpretation of the data have been diverse, but in each case the myth of the ‘peaceful past’ is questioned. This work provides new data on the issue from the north-eastern Iberian Peninsula, associated with the Bell Beaker culture (c.2800–2350 cal BC). Material from two megalithic tombs, Can Gol I and Can Gol II (Barcelona Province), in particular a set of flint arrowheads, has been revisited. Use-wear analysis on the arrowheads confirmed the presence of impact fractures. This indicates that the arrowheads were not funerary offerings, but that they entered the graves lodged in the bodies of the deceased. The data from the only site with evidence of massive death by violence in the neighbouring region (Costa de Can Martorell) reinforce the hypothesis of episodes of conflict and violence during prehistory. However, the interpretation of the nature of such violence remains open to debate: was it an act of warfare or an occasional skirmish? And is the image of the Bell Beaker warrior identified in other European contexts also applicable to this area?

VIOLENCE, THE LATE NEOLITHIC AND THE BELL BEAKER CULTURE

In recent years, numerous archaeological examples of violence and aggression in prehistoric Europe have been published. They cover a wide range of geographical areas and chronological periods: from the Mesolithic (Roksandic 2004; Schulting 2006), Neolithic (Christensen 2004; Golitko and Keeley 2007; Schulting and Wysocki 2005; Wild et al. 2004) and Late Neolithic/Chalcolithic (Beyneix 2007; Meyer et al. 2009) to the Bronze Age (Aranda-Jiménez et al. 2009; Harding 2007; Jantzen et al. 2011). Together with the evidence, new theoretical and methodological approaches and interpretations of conflict and war have appeared (Ferguson 1999; Haas 2001; Lull et al. 2006). Aspects such as the reasons for its appearance, its scale, the weapons used, combat tactics, and methods of identification have been studied through archaeological and ethnographic data (Judd 2008; Parkinson and Duffy 2007; Thorpe 2003). At the same time, some collections of studies have examined one or several of these points (Carman and Harding 1999; Pearson and Thorpe 2005; Schulting and Fibiger 2012, among others). The debate remains open and major points of disagreement still exist. However,
one of the main conclusions shared by the vast majority of researchers is that the myth of the ‘peaceful past’ should be questioned. Keeley (1996), in his classic and controversial book *War Before Civilization*, was one of the first scholars to draw attention to the high level of violence documented in past societies. Rather than peaceful communities, these societies would fight frequently and violently when the situation required (Keeley 1996, 174).

This paper will contribute new data to this debate, through a description of two tombs located in north-east Iberia: Can Gol I and Can Gol II (La Roca del Vallès, Barcelona) (Fig. 1). Both sites reflect different phases of use, although the phase linked with violence is associated with the Bell Beaker culture in both cases. In the area of study, the Bell Beaker culture is partially contemporary with the Véraza culture, and both are situated in the same chronological period: the Late Neolithic (Castro *et al.* 1996, 99–109). The characterization of these two groups is based mainly on artefactual criteria. The Véraza group or Verazian was identified some years ago by a certain pottery type (cylindrical ware with superimposed lugs) and by comparison with an equivalent group in southern France of which it must have been an integral part (Martín 1980; 2003). A set of C14 dates for both cultures has recently been reviewed, with a total of 11 dates for the Bell Beaker, 23 for the Verazian and seven that might belong to either group. The chronological range obtained was 2800–2350 cal BC for the former and 3350–2250 cal BC for the latter (Soriano 2013, 20–2) (Table 1).

The interpretation of the Bell Beaker culture has generated a long discussion in European prehistory which has still not been resolved. The various hypotheses put forward include those that see it as a single population group (Childe 1930; Sangmeister 1963); a set of prestige objects exchanged among elites over long-distance networks (Clarke 1976; Harrison 1977); an ideological ‘koiné’ that homogenized or unified local groups and created a space for exchange and circulation (Vander Linden 2006); or a synthesis of several of these proposals (Benz *et al.* 1998). In our opinion, based on the data available in the present area of study, the Bell Beaker culture cannot be regarded as independent of the Verazian communities. The synchronicity seen in the C14 dates is also visible in other archaeological contexts, both settlements and funerary sites. Bell Beaker settlements are rare although they have been documented both in the open air and in caves and rock-shelters. The former type of site includes Vapor Gorina (Roig *et al.* 2009), Molins de la Vila (Adserías *et al.* 2003), Camí dels Banys de la Mercè (Palomo 2006) and Collet de Bric’s d’Ardèvol (Castany *et al.* 1992, 35). The best documented deposits of the latter type are Level 3 in Cova del Frare (Martín *et al.* 1985) and Roques del Sarró (Equip Sarró 2000). At all of these, pottery with Bell Beaker decoration is associated with Véraza ware. To date, no settlement is known with exclusively Bell Beaker decorated pottery. In contrast, burials have been documented solely with decorated pottery of this type: Can Fatjó dels Aurons (Roig *et al.* 2009), Carrer París (Francès *et al.* 2007), Cova del Calvari (Esteve 1966), Cova de la Ventosa (Llongueras *et al.* 1981), Reguers de Seró (López *et al.* 2010), Torrent de Sant Oleguer (Cuesta 1985), etc. These burials are nearly all located in the same kind of structures as those where only Véraza ware is found (caves, rock-shelters, megaliths, hypogea, chambers with access shafts). However, the main difference lies in their being individual or individualized multiple burials; that is to say, the graves contain a single individual, or several where each one maintains its individuality regarding space and grave goods. In contrast, the characteristic Verazian funerary practice is collective and multiple: the individuals share a single space and grave goods, and are moved when it is necessary to bury a new body or for ideological reasons (manipulation of the bones). The contrast between the conception of death of an individual (Bell Beaker) or the collective type (Verazian) is highly...
Figure 1
TABLE 1

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significant. In our opinion, this points towards the change from a non-asymmetric society to one with social inequalities, in the middle of the Late Neolithic. In this way, the Bell Beaker culture should be interpreted as reflecting the existence of a specific and privileged social group within the Verazian communities. This group would accumulate, both in life and in death, the decorated pottery and the set of objects associated with it. These objects (copper daggers and Palmela points, gold ornaments, archer’s wrist guards, and pyramidal buttons with ‘V’-shaped perforations) are similar to those found among other privileged groups in the rest of Europe. The economic base for subsistence and social reproduction was possibly the appropriation of the main source of food in the community: the livestock and/or pastures (Soriano 2013, 46).

THE SITES: FINDS AND CHRONOLOGY

The sites of Can Gol I and Can Gol II are two megalithic tombs located less than 500 m from each other. They both consist of a rectangular chamber with a passage of the same width as the chamber, the type known as ‘Catalan Passages’ (Fig. 2). The first of the tombs is one of the largest in the whole north-east of the Iberian Peninsula. Its state of conservation is good, as most of the side stones have been conserved and the covering tumulus is partially visible. The second, in contrast, only conserves some of the side stones and currently has the appearance of a cist. Both tombs have lost their capstones. They are located on the Roca del Vallès Prehistoric Trail, an area with a high concentration of megalithic prehistoric sites. A further two megalithic tombs of the same type are known (Dolmen of Céllecs and Dolmen of Can Planas), two hypogea excavated in the rock (Roca Foradada and Pedra Foradada de Can Planes), two blocks with inscribed sculptures (Pedra de les Creus and Plat del Molí), and a rock-shelter with Levantine and Schematic rock art (Pedra de les Orenetes). The study of morphological characteristics, artistic motifs and materials enables these sites to be dated to the Late Neolithic and Early Bronze Age. In turn, the ‘Catalan Passage’ type of tombs was built specifically in the Late Neolithic (Soriano and Vila 2013).

Can Gol I and Can Gol II were discovered in the mid-twentieth century, in the course of archaeological surveying carried out by the Museum of Granollers (Estrada 1947). The first tomb was excavated in 1946, when it was found that the archaeological artefacts had been mixed together by old disturbances (Panyella 1947). The study of these artefacts has shown that the site was used at three different times: Late Neolithic (Bell Beaker culture), Early Bronze Age and the
Iberian Period. Associated with the first phase were fragments of two beakers belonging to the AOO or GZM Epimaritime type and three of the regional Pyrenean type; abundant sherds of undecorated bowls; four tanged and barbed arrowheads (one of which is currently missing) and a flint trapeze; and a *Glycimeris* sp. shell pendant (Fig. 3). In the area of study, identical objects have been found at other sites unmistakably linked with the Bell Beaker culture. This is the case with the arrowheads at Can Fatjó dels Aurons (Roig et al. 2009), Carrer París (Gibaja et al. 2006), Costa de Can Martorell (Palomo and Gibaja 2003) and Reguers de Seró (López et al. 2010). Similarly, the flint trapezes at Collet de Bric d’Ardèvol (Castany et al. 1992, 35) and the pierced shell pendants from Tomb II at Torrent de Sant Oleguer and Can Bosc de Basea (Harrison 1977, 224; Palet Barba 1915–20) can be associated with the Bell Beaker culture. All these materials have also been found at Late Neolithic Véraza sites. However, in the Early Bronze Age and later, they are totally absent from the archaeological record in north-east Iberia (Martín 2003). The Bronze Age materials were restricted to two fragments of carinated ware. This pottery type is widespread in this

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1 We are grateful to Araceli Martín (Archaeology and Palaeontology Bureau of the Government of Catalonia) for the assistance given in identifying this type of beaker.
period and is one of the most common types. Some objects could be associated with either the Bell Beaker culture or the Early Bronze Age. These are four flint blades and 18 pieces of knapping waste; a triangular pendant made of polished stone; and several fragments of human remains. At the time when this grave was excavated, human bones were not usually gathered up, except occasionally the skulls. It is therefore not surprising that so few bones were documented. Finally, corresponding to the Iberian Period are some sherds of hand-made pottery with finger-marked bands, a fragment of amphora or dolia, and six iron remains.

Can Gol II was also excavated in 1946. The objects found, again outside any archaeological context, were only a blade, a trapeze, a borer and six pieces of knapping waste in flint, and a possible arrowhead in jasper (Estrada 1946). At some unknown time, the tomb was excavated again by members of the Vilassar de Dalt Archaeological Group, without any kind of archaeological methodology. During this dig, which lasted a single morning, three tanged and barbed arrowheads were found, as well as flint knapping waste and pottery sherds (Ubach 1994, 164). A review of these objects has found that the pottery is missing and one of the arrowheads had been classified as found at a different site (Can Nadal I). This can be determined from the description of the find, the form of the arrowhead and the raw material. These objects are not chronologically diagnostic. However, because of the typology of the megalithic structure, and the similarity of the objects with those from Can Gol I, we can equally classify them as belonging to the Bell Beaker culture.

**THE CAN GOL ARROWHEADS**

In general, little attention has been paid to the lithic industry of this period by researchers. Its study has not usually gone beyond a mere description of the objects, when they were found inside a tomb (in other domestic contexts, their presence is often not even cited). Fortunately, this situation has changed in recent years. The present paper is a clear example of the current interest in studying lithic industry and the interpretative inferences that can be drawn about the human communities of the time. Thus, the tanged and barbed arrowheads are being studied in depth, because of the conclusions that can be reached, particularly when they are found at funerary sites.

A total of six arrowheads have been studied, three from Can Gol I and the other three from Can Gol II. They all fall within the class of ‘tanged and barbed arrowheads’, although certain differences can be observed in their size and shape. They vary from elongated narrow points with well-developed tangs and barbs (Fig. 4.1 and probably 2) to wide points with long barbs (Fig. 4.3) and shorter, wider points with incipient tangs and barbs (Fig. 4.4, 5 and 6).

Although made of different kinds of flint, they are all similar in one aspect: they are broken in one or several places. The study of the use-wear marks was aimed at determining which of the fractures can be related to the use of these arrowheads in projectiles. The study was carried out with an Olympus stereo microscope with 10–90X magnification and an Olympus BH2 metallographic microscope with 50–400X magnification. The first step in this kind of study is usually to detect and record all the possible organic and inorganic residues adhering to the surface of the objects. In order to be able to observe and examine such residues it is essential that the artefacts should not be cleaned in any way, since this would remove them. However, in this case, the arrowheads were found at sites excavated in the mid-twentieth century, which is a major handicap as nothing at all is known about the cleaning and storage processes these arrowheads have undergone in the intervening decades.

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Most of the pieces were initially studied principally with the stereo microscope, with the microscope revealing that the surfaces were badly affected by gloss, rounding and striations in all directions (Sosna 2012). The use of projectiles may also generate impact striations, which are diagnostic in the case of artefacts recovered correctly and not cleaned. In the present case, the striations cannot be used as a criterion to determine the function of the arrowheads as their cause is unknown and they may have been produced in multiple ways. For example, we cannot differentiate between the striations caused by impact and those generated by the handling and cleaning of the pieces or by their storage together with other lithic items.

The results of the use-wear analysis show that four of the six arrowheads exhibit highly probable impact fractures, as well as other modifications connected with hafting and storing inside a quiver.

- **Arrowhead 46955** (Can Gol I: Fig. 5). It is $16 \times 24 \times 3$ mm in size and the tip exhibits a small step and hinge-terminating bending fracture, possibly caused by its use in a projectile. The tang also displays a hinge-terminating bending fracture, caused by the counter-impact suffered at the time of the impact or when the arrowhead was removed from the shaft. This arrowhead has suffered significant thermal alterations. The cause of this thermal effect is unknown, as the materials found in the grave are nearly all missing. Intentionally burnt points are not usually found in graves similar to this, and it is therefore thought that perhaps some kind of ritual involving fire was performed.
Arrowhead 265 (Can Gol II: Fig. 6). An arrowhead 18 × 23 × 4 mm in size which must have been considerably larger, as much of the tip and the tang have disappeared. Indeed, a large part of the tip suffered a step and slight hinge-terminating bending fracture, possibly as a result of the use of the arrowhead in a projectile. This has caused the loss of over a third of the arrowhead. Both barbs display 90° snap fractures and the tang a counter-impact that has produced a step fracture and fissuration.

Arrowhead 266 (Can Gol II: Fig. 7). With a size of 22 × 20 × 5 mm, it displays a small step-terminating bending fracture at the tip, probably caused by an impact with a hard substance. One of the barbs exhibits a fracture in a vertical direction, which suggests it was caused on being pulled out of a body or object. In turn, the tang exhibits a step and hinge-terminating bending fracture on one of its faces as a result of a counter-impact or bending the shaft while removing it from the body or substance which it had penetrated. In addition, this arrowhead has possible remains of mastic on the tang and pronounced rounding on the barbs, perhaps caused by rubbing against dry hide. This rounding can only be explained by the outer parts of the arrowhead, in this case the barbs, rubbing against the inner face of a container, such as a quiver. It may be concluded that this arrowhead exhibits fractures caused by its use in a projectile.

Arrowhead 243 (Can Gol II: Fig. 8). This arrowhead’s dimensions are 25 × 23 × 4 mm. It displays a series of fractures, some of which are the result of impacts. At the tip, a fissuration fracture (or lateral spin-off) possesses a possible abrupt termination since it is located in a part of the object where the surface is calcareous. Consequently, the fracture exhibits an irregular surface. Both barbs display 90° snap fractures although one of them possesses a feather-terminating fracture, possibly caused by bending. The tang is clearly broken by a counter-impact.
which is reflected in hinge and step-terminating fractures. In conclusion, this arrowhead with possible impact fractures has suffered a hard counter-impact that fractured the tang.

- **Arrowhead 46957 (Can Gol I).** It is $21 \times 12 \times 3$ mm in size, with a 90° snap fracture of one of the barbs. This type of fracture may be caused by several factors, which are usually non-functional. Thus, no criteria are available to confirm or refute that this point was used in a projectile.

- **Arrowhead 46956 (Can Gol I).** This is a fragment of a barb made from flint. The different fractures it exhibits are 90° snap fractures, which do not allow any conclusion as to whether or not it was used.

In summary, most of these arrowheads display highly probable impact fractures. Although it is not always easy to determine which fractures observed on arrowheads are caused by their use as projectiles, in the case of Can Gol I and Can Gol II, the hypothesis that four points display impact fractures is based on the morphology of the fractures (hinge-terminating bending fracture, lateral spin-off, step fracture and fissuration in the tang) and on the fact that they do not normally appear alone, but together in several places, especially in the tip and the tang. In those cases where the points display 90° snap fractures, these have not been considered diagnostic, as experimentation has shown that such fractures can be caused in other ways: during the...
fabrication of the arrowhead, by trampling, etc. A comparison of these weapons with those from other funerary contexts to be described below indicates that they may have entered the deposits lodged in the bodies of the deceased, a consequence of acts of violence, as occurred at the nearby site of Costa de Can Martorell (Palomo and Gibaja 2003).

**DISCUSSION**

The first question to be asked is: Can we be sure that these weapons reflect an episode of violence?

The results of the use-wear analysis of the six arrowheads can be summarized as follows:

Figure 7
Can Gol II, flint arrowhead No. 266. Fracture and possible remains of mastic on the tang.
Four of the six arrowheads (one from Can Gol I and three from Can Gol II) exhibit highly probable impact fractures linked with their use as projectiles. These macroscopic fractures are diagnostic, and are located in the tip and the tang.

The other two arrowheads from Can Gol I exhibit non-diagnostic macroscopic fractures. Their causes cannot be determined, which does not mean that they were not used in projectiles, only that this use cannot be demonstrated. The fractures are located in the barbs and/or in the body of the arrowhead.

All of the arrowheads display fractures.

We consider that these results are sufficient to confirm the existence of an episode of violence linked to the Bell Beaker culture. This assertion is based on three grounds. First, we think it is unlikely that the arrowheads were used against animals (hunting wild animals or...
protecting livestock against predators) rather than against humans. Several researchers have shown that the technical characteristics of arrowheads do not constitute good criteria by which to distinguish between both types of use. This is because both cases require a projectile with the appropriate symmetry and weight for flight and optimal penetration capacity, and which is difficult to extract (Fischer 1989; Pétrequin and Pétrequin 1990). One significant argument comes from the role played by hunting within these communities. Recent reappraisals of archaeobotanical and archaeozoological data suggest that hunting was not a major activity (Soriano 2013, 39–43).2 Archaeobotanical studies indicate that cereal-growing, especially barley (Hordeum vulgare), was quite important. The habitual finds of storage silos at settlements, as well as tools used in agricultural tasks, can corroborate this evidence. In turn, archaeozoological research shows that domestic animals, mainly oviscaprines (Ovis/Capra) but also cattle (Bos taurus) and pigs (Sus domesticus), were as important in the diet as agriculture. However, predators capable of attacking livestock (wolf, fox, bear) are practically absent from the archaeological record. The most common wild species in faunal assemblages are rabbits and hares (Oryctolagus cuniculus/Lepus capensis), while red deer (Cervus elaphus), boar (Sus scropha), horse (Equus caballus) and fox (Canis vulpes) are also found but in much smaller numbers. Other evidence that might indicate the glorification of hunting and/or hunters is completely missing. Such evidence would include deposits of specific parts or ‘trophies’ of hunted animals or the representation of hunting scenes found in the rock art of other prehistoric groups (Menéndez and Quesada 2008).

It is therefore impossible to explain the large number of lithic arrowheads dated to the Late Neolithic without reference to some situation of violence. Arrowheads are, after pottery, among the most common objects at the sites. Flint is the main raw material although quartz is used sporadically. The typological variety is enormous: leaf-shaped points, diamond-shaped, tanged with incipient barbs, tanged with full barbs and, less frequently, asymmetrical points (Martín 2003). Although few technological studies have been carried out to date, a wide range of treatments and fabrication processes suggests a heterogeneous, non-standardized production (Gibaja et al. 2006; Palomo and Gibaja 2003). This imbalance between the abundant arrowheads and the scarce evidence for hunting has been interpreted in other archaeological cases as a clear sign of their use in violence (Honegger et al. 2011; Underhill 1989).

Secondly, similar arrowheads found at other Bell Beaker funerary sites in the area of study are always intact. The absence of fractures indicates that the pieces were deposited in perfect condition, ready to be used, and formed part of the grave goods. In contrast, the discovery of points fractured during use does not accord with the type of ritual that is normally documented and thus requires an alternative explanation. One of these is that they were accidentally introduced into the tomb, lodged in the individuals’ bodies and a cause of wounds and/or their death. Intact arrowheads have been found at the megalithic cist at Reguers de Seró, where one arrowhead was documented (López et al. 2010), and the hypogea at Carrer París, with eight specimens (Gibaja et al. 2006). It is very likely that the arrows were deposited whole, with the shaft and fletchings, and in some cases even inside a quiver, when the arrowheads are found grouped together. This situation has been recorded at several European Bell Beaker sites in Great Britain (Fitzpatrick 2002, 630) and Denmark (Sarauw 2007, 73). Other types of grave goods in

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2 The literature consulted, including references for specific sites and more general works summarizing the data, is: Alonso 2000; Andúgar and Sáñ 2004; Boquer et al. 1995; Buxó 1997; Castany et al. 1992; Edo et al. 2002; Equip Sarró 2000; Martín et al. 1985; Nadal et al. 1999; Piera et al. 2008; Roig et al. 2009; Vicente and Gutiérrez 2004.
Bell Beaker tombs are usually also found whole and/or in a good state of preservation, and not fragmented as at Can Gol I and Can Gol II (Vander Linden 2006).

As a third point, is it possible that not all the arrowheads at the Can Gol sites were used for violence? It seems unlikely. Certainly, the use-wear study found that only 66 per cent of them display highly probable impact fractures linked with their use. However, both experimental and archaeological data indicate that arrowheads do not always fracture during their use. Experimental work has shown that the projectiles often hit the soft parts of the body and tend to pass through the target without touching a bone (Schulting and Wysocki 2005, 108). In these cases, it is very unlikely that the arrowheads will suffer any breakage and, in addition, they will be recovered outside the target’s body. It has equally been shown that on the occasions when the point hits a bone, it does not always fracture and very rarely becomes lodged in the bone. The arrowhead will go through some bones, like scapulae and ribs, while in other cases it simply bounces off without causing any damage to the point (Palomo and Gibaja 2003, 204). An example of this is given in the study by Smith et al. (2007), which aimed to identify the marks made in bones by lithic arrowheads. Out of a total of 32 impacted projectiles, only half of them suffered any kind of fracture, and some of those were microscopic. Within the Iberian Peninsula, several examples of violent episodes of this kind have been documented osteologically (Esparza et al. 2008; Etxeberria and Herrasti 2007, 231–4; Etxeberria and Vegas 1992; Mercadal and Agustí 2006). The most significant sites are the rock-shelter of San Juan ante Portam Latinam (Álava, Basque Country) and the hypogea of Costa de Can Martorell (Dosrius, Barcelona) and Longar (Viana, Navarre). However, at these sites, impact fractures are not visible in all the arrowheads. At the first site, 67 per cent of the 61 arrowheads found are incomplete (Armendáriz 2007, 130), whereas at the second the proportion increases to over 80 per cent of the 68 points recovered (Márquez et al. 2008). Finds of arrowheads or fragments of them lodged in bones are rare. At San Juan ante Portam Latinam, nine cases were identified out of a total of 338 bodies (Etxeberria and Herrasti 2007, 208–20), at Costa de Can Martorell no examples were found in 195 individuals (Márquez et al. 2008, 234), and at Longar four cases were documented in 112 individuals (Armendáriz et al. 1994) (Fig. 9.2). For comparison, large numbers of examples of violence with projectiles are known in France in the Late Neolithic, especially in the south of the country. Guilaine and Zammit (2002, 151–2) have studied some 55 individuals with arrow wounds from 33 multiple burials (Fig. 9.1). We are unaware of any use-wear studies of these arrowheads. The researchers highlight the possible under-representation of this type of evidence, which may have originally been much greater. Among other reasons, they note the evidence of other osteological signs of violence (contusions, dagger wounds) and the presence of arrowheads at the same sites, which have been interpreted as grave goods but which might have been lodged in the soft tissues of the bodies.

In short, given the minimal importance of hunting, the high number of lithic arrowheads, contemporary funerary sites and archaeological and experimental data on projectile impacts support the proposal that the arrowheads studied here are evidence of one or several acts of violence associated with the Bell Beaker culture.

It is extremely interesting to highlight the similarities between the Can Gol I and Can Gol II megalithic tombs and the hypogea of Costa de Can Martorell (Mercadal 2003), the only example of massive death by violence currently known in the north-eastern Iberian Peninsula. First, at Costa de Can Martorell, the stratigraphic data and the osteological study corroborate the fact that a large number of the individuals were buried simultaneously. Other isolated cases of violence have been cited in the area of study, most of which are not dated very precisely (see below) and none of which possesses the magnitude of this site. In the case of Can Gol I and II,
the data obtained concerning the arrowheads and in particular the characteristics of the sites suggest a violent event of certain importance. These are two megalithic graves, a type of tomb whose reuse (proved in the case of Can Gol I) and/or later violation by treasure-hunters and amateurs has been widely documented throughout history. There can be no doubt, therefore, that the original number of arrowheads may have been larger. Second, the three sites are associated with the Bell Beaker culture. An Epimareitime GZM bowl was found in the hypogeum, similar to the one at Can Gol I. The C14 dates place the burial between 2300 and 2200 cal BC (Table 1). Third, the 68 arrowheads that have been documented are all tanged and barbed, whilst displaying great variability. The considerable typological similarities with the arrowheads studied here are significant (Figs. 10 and 11). Lastly, the sites are quite close to one another, as Costa de Can Martorell is less than 10 km from the two megalithic tombs and is one of the nearest sites with Bell Beaker decorated pottery.
Figure 10
Typological similarity between flint arrowheads from the Can Gol I megalithic tomb and the Costa de Can Martorell hypogeum: 1, 5 and 8. Can Gol I Nos. 46957, 46955 and 46956; 2–4, 6, 7, 9 and 10. Costa de Can Martorell Nos. 29, 66, 48, 61, 57, 11 and 33 (after Palomo and Gibaja 2003).
The second question is: What kind of violence was this?

Evidence of violence can be interpreted in different ways, although it is normally understood as being of two main kinds. The first kind includes all examples of individual and spontaneous, impulsive or reactive acts: disputes, homicides, acts of vengeance, etc. The second,
called war or warfare, can be defined as the organized violence of one group or society against another group, involving the use of physical force (Harding 2007, 17; Thorpe 2003, 146). This second kind has aroused the most interest in archaeology, while it encompasses a wide range of different situations: open warfare between organized armies; duels between champions; rapid attacks in the form of razzias; sporadic and occasional skirmishes, and so on. Making distinctions between them is extremely complex and it is often very difficult, if not impossible, to determine clearly what kind of conflict it is. The verification in the archaeological record of certain forms of evidence normally accepted as indicators of violence (see below) is not enough. There is no single ‘recipe’ that can be applied to all societies. In each archaeological case, the relationship between the evidence, its intensity and its frequency of recurrence in time and space should be assessed (Haas 2001, 331). It may be supposed that in an extreme case of ‘total war’, the evidence of conflict will be more diverse, intense and repeated, and vice versa.

The exercise of violence can be detected archaeologically through three types of evidence: the effect violence has on the human body, the means used to exercise it, and the representation of the violence (Lull et al. 2006, 101–3; Thorpe 2003, 150).

The first type is the most direct and certain proof. Human remains with lethal or healed wounds or even with the weapon still lodged in the bone (arrowheads and daggers) are clear indicators. However, the interpretation must be shown to be correct. Traumatic injuries may have many causes, such as falls and fortuitous impacts, or hunting accidents totally unrelated to violence (Judd 2008; Schulting and Wysocki 2005).

The second type includes all forms of structures connected with the defence of a settlement and the objects used for fighting and aggression. Among the former are the strategic position of settlements, walls, bastions, moats, chevaux de frise, ‘no-man’s-land’, etc. While some of these structures are clearly for military purposes, in other cases this has to be demonstrated with evidence that eliminates other hypothetical functions (defence against predators, protection against floods, ritual acts or display, etc.) (Parkinson and Duffy 2007). The nomenclature and classification of the latter have been debated more. The fact that the objects can be used for more than one function means that some researchers have proposed two categories (weapon, specialized weapon) (Lull et al. 2006, 102) or even three (tool-weapon, weapon-tool, weapon) (Chapman 1999, 107–8). In our opinion, the dual division is clearer, as it separates weapons from tools used offensively. The former are objects produced specifically for aggression or for defence (swords, halberds, shields, greaves, armour, etc.). Their existence corresponds to times when violence is a structural part of society and not merely associated with isolated or uncontrolled incidents. The latter kind of implements, used occasionally or repeatedly in violence (arrows, daggers, axes), are originally intended for use in other ways within the community and should not be considered weapons. However, it should be stressed that the distinction between these two categories is dynamic and depends on the exact conditions at any given time. Thus, for example, if it is seen that arrowheads were being produced specifically for warfare, or if the impact marks of metal axes are found repeatedly on human remains, these should be regarded as weapons.

The last type of evidence of violence is the representation of fighting on different kinds of surfaces. Some widely known examples are the battle scenes, archers and ‘public executions’ in Spanish Levantin rock art (López-Montalvo 2011); the common representation of weapons on the menhir-statues and anthropomorphic stelae in the Alpine Chalcolithic (Casini and Fossati 2004); and the scenes of warriors and weapons in northern Europe in the Bronze Age (Harding 2007, 115–18). The limitations to the assessment and interpretation of this type of evidence are
clear. We do not possess the keys to understanding the exact meaning, symbolic content and/or motivation of the depictions. Hence it is not always easy to discriminate between real actions and imaginary, symbolic or ritual battles (Guilaine and Zammit 2002, 138). However, there is no doubt about the social significance of representing weapons and/or implements used offensively on different kinds of artistic objects.

According to these three different types of evidence of violence, the case being studied here is considered to be a clear example of warfare. Its main characteristics can be summarized as typical of occasional or short-lived skirmishes; it is restricted to a very small area; but occurs within a society in which violence acquired certain significance. Several arguments can be put forward to support this hypothesis.

First, evidence of violent death in north-east Iberia in the Late Neolithic is almost non-existent. Apart from the Costa de Can Martorell hypogeum mentioned above, no other case can be unmistakably associated with the Bell Beaker hypogeum and only two are dated to the same period (Late Neolithic), in association with the Verazian. These two sites contained collective and multiple burials. The first is Balma Sargantana, a rock-shelter whose osteological study has detected a significant frequency of cranial traumas and erosion that might have been caused by violence. One of the skulls exhibits a trepanation (Mercadal and Agustí 2006, 46). The second is Cova de Sant Bartomeu, a cave where a human rib with a perimortem incision produced by a sharp edge was found (Soriano 2013, 42). These sites are over 100 and 80 km respectively from the Can Gol sites, and are apparently isolated cases (Fig. 1). Other examples, corresponding to perforations caused by arrows and traumas, lack a stratigraphic context, could equally belong to the Early Bronze Age or Late Bronze Age, and are similarly distant from the area of Can Gol I and Can Gol II. Two metal arrowheads, both associated with skulls, were found at the megalithic tomb of Collet de Su and in Cova H at Cingle Blanc. One was lodged in the left parietal and the other had penetrated the maxillary sinus and the pterygomaxillary fossa (Etxeberría and Vegas 1992, 130). A flint arrowhead fragment was found in the bicipital tuberosity of a radius at Forat de la Conqueta. The 11 C14 dates for this cave show that it was used repeatedly from the Late Neolithic to the Late Bronze Age (González et al. 2011). Four cranial traumas, probably caused by violence, were found out of a total of 14 individuals at Clarà Dolmen. In addition, three trepanations and a skull with incisions in the frontal bone related to scalping were found (Mercadal and Agustí 2008, 85). Finally, at Cova d’Aigües Vives, skull number 2 also displayed signs of scalping and a further three exhibited trepanations (Campillo 2007, 167–75).

There is therefore some evidence of violence in north-east Iberia during recent prehistory. However, this is very little in comparison with the hundreds of human remains studied in the region. It is even less if it is restricted to the Late Neolithic, the period to which Can Gol I and Can Gol II are assigned. Numerous osteological studies of remains attributed to the Verazian (Agustí 1998; Balaguer et al. 2013; Edo et al. 2002), the Bell Beaker culture (Bubner 1976; Cuesta 1985; Esteve 1966; Llongueras et al. 1981) and the Bronze Age (Alesan and Safont 2003–4; Alfonso et al. 2004; Armentano and Malgosa 2002; Armentano et al. 2007; Majó 2001) have failed to find evidence of violence. It is therefore not possible to propose that a situation of repeated and generalized violence existed at that time. The data indicate that it would have been very occasional. In addition, the three cases in the Province of Barcelona that are being cited (Can Gol I, Can Gol II and Costa de Can Martorell) are the only ones proved to be grouped chronologically and spatially. This concentration in such a small area is not thought to be due solely to chance.
Apart from the violent deaths, there is no other osteological evidence to support the idea that combat and conflict were constant amongst these groups. The osteological study for the site of Costa de Can Martorell did not find any clear signs of violence followed by survival. In the case of the three traumas documented, two to the skull and a ‘parry fracture’, it is not possible to distinguish between accidental or induced causes. Contrasting examples are known in the Late Neolithic in other parts of Europe, with a large number of signs of violence followed by healing, both in southern France (Guilaine and Zammit 2002, 151–5) and western Portugal (Silva et al. 2012). At the same time, although it is less conclusive evidence, at Costa de Can Martorell no clear signs of enthesopathies of the elbows were identified. This kind of pathology is related to archery, among many other forms of activity (Campillo et al. 2003). The osteological studies made of other contemporary sites are too limited to be able to support or refute the tendency seen at Costa de Can Martorell (Castellana and Malgosa 1991). Thus, we can only point to the scarcity of information for indicating that the bow was a weapon in repeated use, as would be expected if it was associated with warfare. The lack of wounds with signs of healing is basically the reason for suggesting that the population buried at Costa de Can Martorell suffered an unusual act of violence.

Second, no artistic representations can be related directly with warfare. In the whole of north-east Iberia, we are only aware of one Levantine painting with battle scenes, archers or executions: the rock-shelter of La Vall II in Sierra de Llaberia (Capçanés) (Sarrià et al. 2011, 73). Its location in the south of the area of study is distant from the burial sites and seems to relate it to other Iberian rock art of this kind, which is concentrated further south in Castellón, Teruel and Albacete. This is therefore not a typical theme in the north-east (López-Montalvo 2011, 34). Equally, the steles and statue-menhirs documented in recent years differ from similar monuments in southern France in that they lack any representation of weapons or implements used for aggression (Moya et al. 2010). Representations of daggers, axes, halberds, bows or similar objects do not exist. This may suggest that either the conflicts were not deeply rooted or they did not possess enough social importance to be represented artistically.

Finally, following the criteria described above to differentiate objects used in violence, only one kind of item can be included within the category of weapon: lithic arrowheads. The imbalance between their frequency in the archaeological record and the scarcity of evidence for hunting has already been described. This is hard to explain without resorting to the presence of some situation of violence. However, it is difficult to define this situation of conflict. The current data do not appear to indicate the existence of open warfare or constant fighting. The variety of types and fabrication processes documented in the arrowheads suggest that production was not standardized and is in accordance with small autonomous family groups rather than full-time specialist weapon-makers. The characteristic copper implements in the Bell Beaker group (axes, daggers, Palmela points) would have been used for many functions, all of them unconnected with violence. These would include wood-working and house-building, processing meat and protecting livestock. Archaeological evidence has proved the importance of all such tasks in these communities (Soriano 2013, 39–43). Some daggers lack a point (Travès megalithic tomb) while others exhibit markedly asymmetric edges (Cova de Can Sadurní), indicating that they were used as knives and not for stabbing. Similarly, the shape, size and weight of Palmela points suggest they were used as spear or assegai heads. These points would have been of great use in defending the flocks against predators (op. cit., 145–51). In the whole of the Iberian Peninsula, only the site of...
Grajal de Campos (León) has revealed a possible, but doubtful, association between Palmela points and violence. This is a skull with two points apparently lodged in it (Delibes 1977, 31–2). The fact that the skull is now missing and the points display no impact marks means that the possibility it was really a burial with grave goods cannot be ruled out. Finally, no settlement in the whole area of study is defended by walls, moats, palisades, etc., or is situated in a strategic defensive position.

In summary, in the north-east of the Iberian Peninsula in the Late Neolithic, the osteological evidence of violent deaths and signs of fighting and conflict are almost non-existent. One of the three cases known is located very near the studied sites (Costa de Can Martorell) and the other two are more distant (Balma Sargantana, Cova de Sant Bartomeu). No artistic representations of violent acts, or settlements with defensive structures or in strategic locations have been documented. All this suggests the violence was occasional and limited to specific areas. However, flint arrowheads, which should be regarded as weapons and not as tools, are found all over the region, indicating that violence must have been quite widespread in these communities. How can this apparent contradiction be explained? Two possible hypotheses should be tested in the future:

1. Hypothesis 1. Violence is latent in the community but only breaks out in certain specific situations when disagreements cannot be resolved in any other way. The explanation for the abundance of arrowheads is found in the communities in the south of France, with which north-east Iberia was closely linked in the Late Neolithic (Martín 2003). In this area violence was common and recurrent, as attested by the numerous arrowheads, death by arrow wounds, settlements with defensive structures, and menhir-statues depicting weapons (Guilaine and Zammit 2002, 149–68). In this way, the production of arrowheads in north-east Iberia reflected a response of dissuasion and/or a reminder of the situation of war in the neighbouring territory on the other side of the Pyrenees.

2. Hypothesis 2. Violence, while it was still occasional, was somewhat more widespread than the current evidence suggests. There would have been more areas of fighting or its order of magnitude would have been more serious. Its apparent invisibility is due partly to the constant reuse of graves in this period, which hinders osteological studies and the identification of violent deaths. It should be borne in mind that most of the sites in the Iberian Peninsula where osteological proof of violence has been detected were not reused (Armendáriz 2007; Esparza et al. 2008; Etxeberría and Herrasti 2007; Etxeberría and Vegas 1992; Márquez et al. 2008; Mercadal 2003). In addition, few systematic use-wear studies have been performed on the flint arrowheads, most of which were found several decades ago in excavations without archaeological methodology. While the first limitation is almost impossible to overcome, the second can be solved.

CONCLUSIONS: BELL BEAKER VIOLENCE ON THE NORTH-EAST COAST OF THE IBERIAN PENINSULA

This paper has presented the chronological, typological and contextual data of two megalithic tombs, Can Gol I and Can Gol II. The use-wear analysis of the arrowheads found inside them and the comparison with archaeological, ethnological and experimental data suggest that an episode of violence took place. This event is linked with the Bell Beaker culture but cannot be interpreted as reflecting a scenario of open warfare. The available information in the area of study indicates that it would have been a rare, short-lived skirmish; unplanned and
restricted to a very specific area, yet within a context that still remains to be defined, in which violence was quite significant.

This situation contrasts with the image of the Bell Beaker warrior proposed by some researchers for other areas in the Iberian Peninsula and Europe (Garrido-Peña 2006; Lemercier 2011). It is true that in north-east Iberia individual tombs, or individualized graves within multiple tombs, have been found in which the grave goods consist of flint arrowheads, copper daggers and Palmela points. However, as has been reasoned here, only the arrowheads can be considered as weapons. The archaeological record suggests copper implements could be related to pastoralism and the importance this activity held for Late Neolithic communities (Soriano 2013, 39–43). The cited tombs seem to reflect the control exercised over livestock and/or pastures by a specific privileged social group, identified with the Bell Beaker set. In addition, the evidence of violence associated with the Bell Beaker culture at a European level is negligible (Guilaine and Zammit 2002, 151). The recent study of Bell Beaker anthropological remains in the Czech Republic has shown that the presence of violent traumas is minimal (Sosna 2012, 327). Similarly, for the rest of Europe we are only aware of six individuals with clear evidence of violence: in England, a young man in the middle ditch fill at Stonehenge with an arrowhead lodged in his rib, Ring Ditch 201 at Barrow Hills (Radley, Oxfordshire) in which a male individual was located with an arrowhead in the area of the ribcage (Harding 2007, 52), and a cranium from the Thames (Syon Reach) with a healed trauma to the parietals (Edwards et al. 2009, 43); in southern France, the individual in the grave at La Fare (Forcalquier, Alpes-de-Haute-Provence) with a wound in an ulna caused by a flint implement, and the Tumulus of the Gendarme (Plan d’Aups, Var) with a leaf-shaped flint arrowhead lodged in an individual’s femur (Lemercier 2011, 140); and in Germany, a skeleton from Weimar (Thuringia) with fractures from a fatal blow to the left parietal bone (Christensen 2004, 137). With this evidence, even supposing that the number of cases that we are unaware of may be two or three times as large, should not the concept of the Bell Beaker culture as a phenomenon linked with war and violence be seriously reconsidered?

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