Historical Context of Tsantsa (shrunken heads) and Shrinkage Studies Performed Using Pig Heads

Tobias Houlton

Supervisor: Prof. Caroline Wilkinson

Centre for Anatomy and Human Identification, University of Dundee, Dundee, DD1 4EH

Abstract

The Shuar tribes of South America are known for their one time custom of head shrinking. The aims of this research were to comprehend the historic significance of tsantsa production within the Shuar tribe, consider the trade and possible identification of counterfeit shrunken heads amongst Western curio-hunters, and understand the effects of head shrinking upon facial morphology. Here, two pig heads were shrunk using the prescribed Shuar method – yielding results that suggest that dense cartilaginous tissue shrinks at a slower rate than skin.

Keywords: Tsantsa, head shrinking, Shuar tribes, craniofacial reconstruction.

Shuar history

The Shuar tribes, famous for their one time custom of head shrinking, are situated within the Eastern montaña of Ecuador and Northern Peru. They are possibly the largest tribe in North-Western South America and consist of four sub-tribes or dialect groups (Weyer, 1959; Service, 1963; Jamieson, 2010), the Untsuri Shuar, Achuar, Huambiza and Aguaruna (Harner, 1984; Bennett et al, 2002).

The Shuar are known for their warfare strategies and are fiercely protective of their freedom (Anthony, 1921; Jamieson, 2010). They are reputed as being the only group of South American Indians to have successfully resisted Spanish invasion, since the Spanish conquest in 1599, and to have thwarted all subsequent attempts by the Spanish (Drown and Drown, 1961; Harner, 1984).
During the Spanish conquest, on March 25th 1550, Captain Hernando de Benavente named the tribe in a letter to the Royal Audiencia of Spain as the “Jivaro” (Hendricks, 1993). This term has a derogatory connotation, used as a synonym for “savage”, “uncivilised” and “heathen”. (Jamieson, 2010; Hendricks, 1993). However, their real name to which they should be referred is “Shuar”, meaning person or people (Drown and Drown, 1961; Hendricks 1993).

The Shuar were otherwise engaged in inter-tribal warfare that stemmed from an intense spiritual belief system consisting of a fervent conviction of witchcraft and sorcery, and a loyalty to their ancestors (Service, 1963). Their existence has long excited the imagination of many modern Europeans, particularly for their notoriety in shrinking and preserving the human heads of their enemies (Service, 1963).

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**Shuar head shrinking**

**History of head shrinking**

Head trophies and the shrinking of heads, formally known as tsantsa production, is not believed to be a purely Shuar practice. It is thought that because of the relative isolation of the Shuar tribe, they retained a custom that was once widespread in North-Western South America (Service, 1963).

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1 A court that functioned as an appellate court in Spain and its empire. An appellate court being any court of law that is empowered to hear an appeal of a trial court or other lower tribunal.

Archeological evidence relating to the preparation of trophy heads in the Central Andes describes a long history, beginning in the Pre-Ceramic Period (post 1800 B.C.) and continuing through Inca times (Stirling, 1938; Proulx, 2001). Almost every major culture in this area, including Chavin, Cupisnique, Moche, Paracas, Nasca, Huari, Chimú and Inca, practiced this tradition, although each of these cultures engaged in their own unique ceremonies, with different ritualistic contexts for head taking (Proulx, 2001).

Evidence relevant to the preparation of shrunken heads was found during pre-Columbian times (pre 1492 A.D.) over a wide area of Peru. Such examples are commonly found in both ceramic and textile art and sometimes carvings on stone and shell (Stirling, 1938).

**Fig. 1:** Prehistoric representations of reduced human heads. a, b, c, e, f, are textile designs from the peninsula of Parcas. d, is a detail taken from a design on an effigy jar from Nasca (Stirling, 1938).
Existing head trophies from the Nasca and Mundurucú tribe have had identified similarities to the Shuar’s tsantsa in regards to methods of trophy processing and its ritualistic purposes (Uhle, 1908; Harner, 1984; Stirling, 1938; Proulx, 1999; Verano, 2003; Jamieson, 2010). However physical evidence of head trophies, preserved in the fashion of the Shuar tsantsa, were identified in 1527 (Estete, 1918) by traveler and chronicler, Miguel de Estete, when exploring the Ecuadorian coast. In Pasao, 1555, cured corpses of men and children were found crucified on posts in some temples, alongside them heads of Indians that had been shrunk to the size of a fist (Zárate, 1853; Stirling 1938). During the Spanish Conquest, practices of head shrinking were found as far north as the Panuco River in Mexico. In the Huastec country, the Spaniards found heads of captured victims placed on the walls of the native temple (Lorent, 1860). Among the Cunas and Caimanes Indians along the Atrato River region, in North-West Columbia, it was documented that the average local, not enemy, when deceased, had their head preserved in the same manner as the Shuar tsantsa, with string tassels hanging from the lips (Saffray, 1873).

Prieto (1885) was the first to knowingly become acquainted with the Shuar and their methods of head shrinking (Stirling, 1938). From existing accounts amongst the Shuar, the Untsuri Shuar claim to be first in performing head shrinking, the Achuara and Huambiza adopted it later. There is no found account regarding the Aguaruna sub-tribe, however the Candoshi tribe (who are not Shuar) from the Peruvian Amazon, are believed to have learnt head shrinking from the Achuara and Huambiza (Wallis, 1965).

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**Shuar method of head shrinking**

Existing accounts from academic observers on head shrinking methodology imply different methods for each studied sub-tribe. This evidence may however be coincidental (Up de Graff, 1923; Flornoy, 1953; Jamieson, 2010). To condense these given methods into a single sequence of events, the following account was made:

1. An incision was made from the occipital protuberance to the point where the head was decapitated. The skin then peeled from the skull, using sharpened chonta pins to carefully cut around the eyes, nose and ears. The skull then discarded into the river as a gift to the *pani*, the anaconda (River god), or sometimes abandoned at the trophy-processing camp.

2. Eyes were stitched closed and the mouth pinned together by chonta pins. This was to hold the facial features in position and seal its openings, believed to help the head retain its normal proportions by permitting an even contraction of the whole head, during the process of curing (Up de Graff, 1923).
3. The skin was placed into a cooking jar filled with river water, and placed on the fire (Jandial, 2004). When the water reached near boiling point, the skin was removed, typically by the hair or using a stick, to avoid excessively softening the flesh with consequential tearing, also avoiding scalding the hair roots, which would cause the hair to drop out.

4. Excess flesh, not successfully removed before simmering, was scraped off with a knife and the initial incision sewn together.

5. Hot stones were collected and heated on the fire before being dropped, one at a time, through the neck opening, to seer the interior. As each stone cooled it was replaced by another hot stone. During this procedure, the head was constantly rotated, to prevent scorching inside. As the head capacity reduced as it shrunk, the stones were replaced by hot sand. As with the stones, the sand, once cooled, was replaced with fresh, hot sand. During this process, hot flat stones were used to iron the face, sealing and shaping the features. The natural oil that exuded from the skin’s pores enabled the stones to easily slide over and cure the face. The skin was also pressed, shaped and blackened by using the thumbs dipped in ashes.

6. Once the head had shrunk to the size of a large orange, and the skin smoothed, hardened and toughened, they were hung in the smoke of a fire to preserve and protect them from insects.

7. During the tsantsa feast of “Napin”, the warriors made a hole at the top of the tsantsa. A double kumai knot was inserted and tied to a shirt stick of chonta palm inside, this allowed the head to be worn around the warrior’s neck (see Fig. 2). The chontas were removed from the lips, and replaced by frayed cotton fibres made into tassels that were then hung over the mouth. Further decorations could be applied, which often included toucan feather earrings (Karsten, 1935).

Fig. 2: Warrior wearing tsantsa trophy around his neck (Karsten, 1935).

Accounts of shrinking heads, other than human, include animals such as sloth, jaguars, condors and monkeys. These were often revenge killings because the animal had harmed a tribal member (Karsten, 1935; Stirling, 1938).
Substitute tsantsa

It was not uncommon that during an inter-tribal war an Indian may kill his enemy but fail to take his head (Stirling, 1938; Harner, 1984; Jamieson, 2010).

A substitute head would often include a sloth’s head (see Fig. 3). According to Shuar beliefs, all humans are the direct descendants of all animals. Uñushi the sloth is believed to be the first Shuar, and when the original blood revenge feud took place, the sons of Mika and Ahimbi, cut off Uñushi’s head and from it, made the first tsantsa. The Shuar claim to tracing most of their ancient human qualities to the sloth, believing it to be a direct survivor of ancient times, making it acceptable to use its head (Stirling, 1938; Jamieson, 2010).

Alternatively, the killer may borrow a tsantsa from someone who has killed on a previous headhunting raid. Through ritual procedure, the Muisak, or avenging spirit, of the recent victim is forced to enter the old tsantsa (Harner, 1984).

A final method for a substitute tsantsa would be to create an “untsuri suara”. In this instance, the killer would pull out some of his victim's hair during the raid. The hair was believed to symbolise the presence of the dead enemy’s Muisak. It was, attached to a tree gourd with beeswax, and used as a substitute tsantsa (Jamieson, 2010).

The purpose of tsantsa

The creating of a tsantsa was to trap and paralyse the enemy’s “Muisak”, or avenging spirit, after their death, before it could escape and take the form of a demon that would seek revenge. A tsantsa brought strength to a warrior, and pleased his spirit ancestors, ensuring his future good fortune.

Tsantsa preservation implied a deadly insult to an enemy. The Shuar believed there could not be more than a certain number of persons or identities in existence at one time. If the face, identity and name of the dead, were not stripped away from a deceased person, it could not be recycled to create a new living person (Barley, 1995). Once a tsantsa was drained of its power, it lost value and would be discarded or treated as a mere ornament (Stirling, 1938; Jamieson, 2010).
The Western tsantsa: Curio-hunters and counterfeits

In the 1850s, enthused by tales of head-shrinking practices, Europeans were beginning to infiltrate the Shuar region in quest of tsantsa (Jamieson, 2010). In the early 1900s this encouraged a brisk trade in the manufacture of counterfeit tsantsa in Ecuador, Columbia and Panama (Up de Graff, 1923; Stirling, 1938; Verano, 2003; Jamieson, 2010).

Counterfeit tsantsa were made from both human and non-human sources. Non-human counterfeit tsantsa were often made out of goat or monkey skin. Human tsantsa were frequently sourced from the corpses of unclaimed hospital dead or bodies fraudulently obtained from morgues (Stirling, 1938; Jamieson, 2010).

To identify counterfeit tsantsa the following guidelines are employed:

1. Facial down is not removed and appearance lacks a polished finish.
2. The skin is not blackened. The black is however a superficial colouring applied onto the skin, and in old, worn authentic specimens the yellow colour of the skin is often exposed.
3. In the event of animal heads being constructed to look like human tsantsa, the difficulty encountered in making the shrunken non-human ear look like the intricate human ear makes a counterfeit more obvious.
4. Counterfeits are generally less thoroughly shrunk and exude a certain amount of oil.
5. In a counterfeit, sometimes no perforations are found round the lips by chonta-wood pins. The Shuar perforated tsantsa lips vertically and made three or four holes through which chonta pins inserted.
6. If counterfeit, sometimes the lips are sewn together with light threads instead of heavy cotton string.
7. The Shuar invariably pierced the crown of the head with a circular incision through which a suspension cord was passed. Sometimes two holes placed along the median line of the crown. Counterfeiters usually omitted these perforations.
8. The stitch-work of a counterfeiter is often more skillfully executed than that of a Shuar, as a result of access to finer tools and finer fibre or thread.
9. The Shuar have a typical method for distorting facial features, which include extending the lips and spreading the nostrils. The forehead is often compressed laterally, with two depressions at temple level, (most likely from grasping the head at these two points during preparation). The facial features in counterfeit heads may appear more natural than that of genuine Shuar tsantsa. (Sirling, 1938; Jamieson, 2010)

The Shuar head shrinking techniques can be accurately replicated, making detection of a counterfeit from the genuine difficult (Philippi, 1872).
Pig head shrinking: Measurements and method

Introduction

The Shuar tribe head shrinking method [see pp. 5-7] was applied to two pigs heads, within a western laboratory environment. Here, an electric heat source replaced an open fire. Observation of morphological change, craniofacial measurements and laser scan were collected to demonstrate how the pig heads altered during head shrinking. This gave the researcher an understanding of how the head shrinking process might affect a face.

Methods

Measuring craniofacial landmarks:
Craniofacial landmarks on the pig faces were marked using permanent ink marker; measurements were collected using sliding calipers and soft measuring tape. Landmarks were placed according to Quantitative Assessment of the Morphology of the Pig’s Head Used as a Model in Surgical Experimentation Part 1: Methods of Measurements (Munro and Vanderby, 1976).

Laser scanning:
A digital scan of each head was collected utilizing a FastSCAN™ Scorpion laser surface scanner before and after head shrinking. Scanner settings included the profile-smoothing filter set to “low” (options being low, medium or high), to avoid a loss of detail in the scan. Wand sensitivity was set to 2 (from a scale of 1 (minimum sensitivity) to 6 (maximum sensitivity)), to preserve maximum obtainable detail, and avoid image artefacts caused by operator error. Once scanned, a “Basic Surface” was generated to merge multiple sweeps made when scanning. The parameters that control this function are within the “Generate Surface” option. The “Smoothing” option (which limits the extent to which each sweep smoothly ‘stitches’ with another) was set at 4.0. The “Decimation” value, which affects triangulation detail of the scan and subsequent file size, was set to 2.0. All scans made were saved as an ‘.stl’ file. ‘Before’ and ‘after’ head shrinking scans, were opened in Freeform Modelling Plus™ (version 9.0). The ‘before’ image was superimposed with the ‘after’ image to make a visual comparison.

Photographic Evidence:
Photographs were taken using a Nikon D20 digital camera and an attached D20AF-N iTTL AF Nikon camera flash. A Nikon 18-200mm F3.5-5.6G IF-ED AF-S VR DX zoom lens was used at a distance of 6 feet. A scale was included.
Test 1
Head shrinking methods for Pig Head 1

1. The pig head supplied by the butcher was already decapitated and shaved. From the point of decapitation, the skin was drawn back on both sides and carefully peeled from the skull using a scalpel. At the eyes, ears and nose area, some extra cutting was necessary. The skull was no longer required.

2. The face was turned inside out and as much subcutaneous fat and muscle tissue as possible was removed using a scalpel.

3. The lips were pierced with 4 handmade, balsa wood pins (chontas) measuring 50mms x 8mms. The eyelids were sewn shut with surgical suturing materials.

4. The head was placed in a large pot and covered in cold water. The water was brought up to 80°C, which was just simmering. The head was gently simmered for an hour only, as the tissue was becoming very flaccid.

5. As so much water had been absorbed during the simmering process, the head had become fragile and difficult to handle. It was placed face down, in a bowl for support, and covered in a kilo quantity of salt, for 24 hours. This dehydrated the tissue, making it strong enough to withstand suturing. (Some tearing had occurred because of its fragility). N.B. The salting procedure was a rescue measure and not part of the Shuar tribe’s head shrinking method.

6. Any further excess fat and tissue was gently removed. This was important so that the final drying process would be more successful.

7. Using strong surgical suturing material, the decapitation incision along the jaw area, was sewn up.

8. Hot pebbles were placed into the remaining neck cavity. These were constantly tilted and rolled to keep them from burning the flesh. Due to the weight and fragility of the head, it was kept in the bowl to support it (N.B. Throughout the shrinking process, care was taken to constantly mould and knead the loose facial skin to avoid the features becoming distorted.)

9. As the neck cavity began to reduce in size, the pebbles were replaced by hot sand being poured into the head cavity. This completed the shrinking process before dehydration.

10. The Shuar tribe would have suspended a shrunken head in the smoke of a fire to dry and cure but this was not practical for this experiment. The shrunken pig head was dried in a domestic oven for 1
hour, at 150˚C, adjusting the position as appropriate to dry evenly.

Test 2
Head shrinking methods for Pig Head 2

1. The pig head supplied by the butcher was already decapitated and shaved. The head was prepared in the same way as the 1st pig head. (See points 1-3 above.)

2. For this test the 2nd pig head was placed into a pan of already simmering water, at a hotter temperature of 90˚C, and simmered for 2 hours. The simmering was visibly more active.

1. Points 6 – 10 of Pig test 1 were repeated on Pig head 2.

Results and observations

Craniofacial changes recorded: Pig head 1

Table 1: Test 1 - Measurements made before and after simmering and at the end of head shrinking. Percentage changes recorded from Stages; 1 - 2, 2 - 3, and overall percentage changes from 1 - 3.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Measure</th>
<th>Original Dimension (mm)</th>
<th>After Simmering (mm)</th>
<th>After Drying (mm)</th>
<th>% Change After Stage 2</th>
<th>% Change After Stage 3</th>
<th>% Overall Change 1 to 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Width</td>
<td>150</td>
<td>150</td>
<td>90</td>
<td>15.70</td>
<td>8.89</td>
<td>35.37</td>
</tr>
<tr>
<td>2</td>
<td>Width</td>
<td>150</td>
<td>150</td>
<td>78</td>
<td>11.36</td>
<td>12.75</td>
<td>24.11</td>
</tr>
<tr>
<td>3</td>
<td>Width</td>
<td>150</td>
<td>150</td>
<td>78</td>
<td>11.36</td>
<td>12.75</td>
<td>24.11</td>
</tr>
</tbody>
</table>

KEY. Stage 1 = Before simmering.
Stage 2 = After simmering.
Stage 3 = After drying.

Photographic comparison:

Fig. 4: Front and side profile photograph of pig head 1 before shrinking.
Fig. 5: Front and side profile of pig head 1 after shrinking.

Visual recording using the FastSCAN™ laser scanner:

Fig. 6: Scanned recordings of head 1 “Before” and “After” head shrinking (in FreeForm™).

Fig. 7: Superimposed scan of head 1 showing side, three-quarter and front profile (in FreeForm™).
Pig head study 1

The initial heat source for simmering was not adequate and resulted in a barely simmering temperature. As the head had been placed in cold water first and then heated, excessive water absorption occurred.

As the pig head had absorbed too much water, it made it very difficult to work with. The head was so fragile it tore in a few places during handling.

The head had to be dehydrated in salt to make the tissue stronger and before the head shrinking process could be continued.

As the head was supported in a bowl while being dehydrated, it conformed to the shape of the bowl, giving the face a convex appearance.

Craniofacial changes recorded: Pig head 2

Table 2: Test 2 - Measurements made before and after simmering and at the end of head shrinking. Percentage changes recorded from Stage 1 to Stage 2, 2 to 3, and overall percentage changes from Stages 1 to 3.

KEY. Stage 1 = Before shrinking.
Stage 2 = After simmering.
Stage 3 = After drying.

Photographic comparison:

Fig. 8: Front and side profile photograph of pig head 1, before shrinking
Fig. 9: Front and side profile of pig head 1, after shrinking.

Visual recording using the FastSCAN™ laser scanner:

Fig. 10: Scanned recordings of head 2 “Before” and “After” head shrinking (in FreeForm™).

Fig. 11: Superimposed scan of head 2 showing side, three-quarter and front profile (in FreeForm™).
Pig head study 2

Lessons were learnt from the 1st test and rectified in the 2nd test.

The pig head was added to already simmering water, at a higher simmering level, thus avoiding the excess water absorption, as experienced in test 1.

As pig head 2 was much less fragile, there was minimal damage during handling.

The head was not allowed to shrink in a fixed position, to avoid the tissue distortion experienced with pig 1. An exaggerated facial distortion did occur however, during shrinking, while trying to support, by hand, the hot and large sized head.

Overall, Pig head 2 was a more successful result.

Discussion

To successfully shrink a pig head, as much fat and tissue as possible should be removed from the head’s skin. The pig head must then be placed in simmering water at 90°C for approximately two hours. The hot stones should be continually rotated, to avoid burning and tissue distortion as the head shrinks. After applying hot sand, the head should be thoroughly dried in an oven at 150°C for one hour.

Conclusion

Both pig heads shrunk to approximately half their original size; the skin, shrunk at a slower rate around cartilaginous areas. The lower face shrunk markedly as it had the most fat removed and had no cartilage. Additional application of hot stones and sand were required to shrink the cartilaginous nose and ears, to maintain proportions.

The rate, at which skin shrinks, in comparison to cartilaginous tissue, might account for the nose of a human tsantsa often being in an upturned position, emphasizing the nostrils.

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