



Possible Signs of Life in the Shroud of Turin: The Perspective of a Facial Plastic Surgeon

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Abstract

Background: It has been assumed that the person represented on the Shroud of Turin is dead and the image corresponds to a person dead from crucifixion.

Methods: We examined the faces of the cadavers (n=26) that were received as a donation, with special attention to their nasolabial folds and the positioning of the lower lip. All cadavers were examined upon arrival and between 24 h to 30 h *postmortem*. Then, we established a comparison with their *premortem* appearance as observed in both the ID and their photograph showed by the family. Lapse of time between the photograph and death is less than one year. Three independent observers examined the presence or absence of nasolabial folds and the location of upper and lower lips.

Results: The presence of face life signs could show that the image could correspond to a living person who is initiating a getting-up movement.

Conclusion: The figure in the Shroud of Turin might correspond to a living man starting a getting up gesture. Thus, a remarkable symmetry is found between the data obtained from the image and the events described in the Gospels, regarding the death and resurrection of Jesus.

Keywords: Shroud of Turin; Nasolabial folds; Signs of life

Introduction

The postural analysis of the figure present in the Shroud of Turin has been an object of study in recent decades. The majority of these analyses have been carried out by forensics who has described the appearance of the figure as reflecting the *postmortem* rigidity posture of a dead body after death by crucifixion [1]. It has been assumed that the figure corresponds to a person who has been crucified and has suffered the same injuries as those described in the Gospels [1-3] and that therefore the probability that it is the figure of Jesus is very high [4].

The aim of this study is to analyze through medical reasoning whether the image on the Shroud is that of or represents a dead or alive human body. To do this, we will assume, as most previous studies have done, that the image corresponds to Jesus of Nazareth. This assumption will enable us to apply up-to-date scientific medical knowledge and medical reasoning to the data obtained from the bibliographical sources regarding i.e., the previous nutritional/physiological state of the person before death, trauma and efforts prior to crucifixion, the posture of the body after death and potential manipulations to the corpse or the interval between torture and death, to give some examples. All these factors might affect the condition of the corpse and therefore, without knowing about them, it would be very difficult to analyze the anatomical features and body disposition of the image of the Shroud.

Material and Methods

The material of the study is based on the extensive collection of photographs taken during the STURP analysis performed in 1978. The reference material regarding the death of Jesus of Nazareth is made up of a body of literature and not a physical body or its remains. In this sense, the credibility of any study about the death of Jesus will be basically determined by the credibility of the sources. Reference material includes the writings of ancient Christians as well as non-Christian authors. Using the historical-legal method of scientific research, scholars have established the reliability and precision of the ancient manuscripts.

In order to analyze specific facial features we have carried out a study in the faculty of medicine

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at our university in which we examined the faces of the cadavers (n=26) that were received as a donation for the anatomy department, with special attention to their nasolabial folds and the positioning of the lower lip. All cadavers were examined upon arrival, between 24 h to 30 h *postmortem*. Then, we established a comparison with their *premortem* appearance as observed in both the ID and their photograph showed by the family. Lapse of time between the photograph and death is less than one year. Three independent observers examined the presence or absence of nasolabial folds and the location of upper and lower lips.

Description

Jesus was a person who must have walked frequently. It has been described on many occasions that he moved from one region of Israel to another. Therefore, his hepatic glycogen reserve would frequently be depleted, as opposed to his muscular glycogen reserve that would be his main source of energy, which takes a few hours to disappear after fasting and intense exercise [5]. Approaching the time of his death, we are told that the previous night he had eaten unleavened bread and wine, as well as the rest of traditional food eaten at the *Séder Pésaj* dinner such as lamb, boiled egg and bitter herbs, and even that several toasts were made (Matthew 26:26).

Crucifixion

When he arrived at the place of crucifixion, he was nailed to the cross that he was carrying by means of nails in his hands and feet. It seems that there were two nails, one per foot, as was the Roman custom of crucifying and as is attested by numerous authors who described the appearance of crucified bodies as riding on horseback with the knees bent [6]. The *sedile* or *supedanium* located under the soles of the feet was arranged so that the crucified had some support and would thus be able to stand up and stretch the joints or take some air, according to some authors, for the sake of prolonging the torture for many hours. It has been described that the crucified person dies of suffocation [2] but such claims have been contradicted by other experiments in which several volunteers were hung on a cross and there was no visual evidence of breathing difficulties throughout the suspension [7].

We know that Jesus was alive while nailed to the cross from the sixth hour to the ninth hour (about 3 h) and that he even spoke seven times, one of them with a cry. The fact that he spoke on so many occasions despite the supposed respiratory distress suggests that there may not have been a ventilation problem.

Let us now focus on his hands. Where did the nails penetrate? Some doctors claim that it was through the space of Destot [2]. This space is located on the palm of the hand close to the little finger and would rarely cause paralysis of the median nerve. It has also been described that it could have been between the ulna and radius bones at the distal forearm, but the injury of the theoretical exit hole in the Shroud does not match with that site. Frederick Zugibe suggests that it was in the highest part of the palm and in an oblique direction upwards. In this way, a median nerve injury occurs, the skin of the hand is not torn at that site by the weight of the body and no bone is broken, with the nail exiting on the dorsum [7]. A distal injury to the median nerve causes the thumb to extend and be placed in the same plane as the other four fingers and approximated to the index this is called "the ape hand". It is produced by the action of various muscles: on the one hand, the long and short extensors of the thumb, innervated by the radial nerve, which cause the thumb to lie flat and,

on the other hand, the adductor of the thumb, innervated by the ulnar nerve, which causes the thumb to approach the index. This is also facilitated by the paralysis of the opposing muscle of the thumb, as it is innervated by the median nerve. It is not possible to see the atrophy of the thenar eminence since that sign only occurs when muscle atrophy has been reached over time. However, the absence of visualization of the thumbs in the Shroud of Turin has been attributed to the paralysis of the median nerve [8], a fact that is not possible because there is precisely a paralysis of the opposing thumb muscle, as has previously been explained.

Death

After about three hours of crucifixion, Jesus died. The bowing of his head excludes the possibility of a death in tetanic contraction that could justify a *posteriori* or explain rigid body postures in any part of the body, especially in the face.

In summary, at the time of death, Jesus had been fasting for approximately twelve hours, exhausted, without reserves of liver glycogen, but probably without muscle glycogen depletion due to physical exertion because of the shortness of the agony, dehydrated, bled out, hypovolemic and with fever, in conditions of outdoor temperature more or less warm.

When a person dies, there is initially a general muscular relaxation and after approximately three hours *postmortem* stiffness begins, although this interval might fluctuate depending on muscle mass and other factors [9,10]. The time until the stiffness is established is directly proportional to the amount of glycogen. Therefore, if the glycogen stores were depleted in Jesus, this rigidity would appear at an early stage [9]. The intensity of stiffness depends on many internal and external factors. Intense fatigue (in agonizing and prolonged deaths) and large hemorrhages decrease tissue hydration so that stiffness appears at an early stage, and is weak and of short duration [11]. In summary, it is very difficult to determine the intensity of the rigidity that the body of Jesus could have presented since some data indicate that it could have been intense while other data denote that it could have been weak. Nevertheless, there is common agreement that it was early, so the onset would have been approximately 20 min to 45 min after death due to the body's low glycogen reserve [11,12].

What could have happened to the body once it died? As previously explained, there would have been an initial relaxation of the entire musculature. The head would have dropped at the level of the shoulder blades, as has been described [13]. The verticality of the cross would cause the jaw to drop and the mouth to open. The entire trunk would descend and cause a marked accentuation of knee flexion. This body descent would also cause a radial or upward rotation of the hands whose axis of rotation is the nail that supports them. This rotation would probably keep the extension of the thumb, placed flat and in line with the other four fingers, and it would not fall towards the palm of the hand by gravity (Figure 1).

Descent

After a short time, the body would become rigid, fixing this relaxation posture with more or less intensity. Does the rigidity of this position matter to interpret the image that appears in the Shroud of Turin? I think not. The fundamental reason is that, once the body of Jesus had been lowered from the cross, the body was handled by the lifters and later by the gravediggers. Proof of this is that the arms, which should be open or separated from the body by the crucifixion, are placed downwards, as they appear in the Shroud.



Figure 1: Upward rotation of the hand as the body descends after death. Note how the thumb remains at the same plane as the other four fingers, as occurs in a distal median nerve injury.

Results

It is known that we can place a corpse in postures that can simulate that they are alive and, conversely, we can make a live body adopt postures that simulate a corpse. In order to discern whether a body is dead or not, we must check for its breathing, pulse, pupillary dilation and neurological reflexes [9,14]. All these signs are impossible to determine just by looking at the image in the Shroud of Turin for obvious reasons. We can intuit that he was dead because we assume that it was Jesus, we can see a wound in his side and we read in the Gospels that he died, but if we did not know these data it would be impossible to know if he was really dead. Therefore, the question we must ask ourselves is the following: Is there any sign present in the Shroud figure whose presence is incompatible in a corpse or whose manipulation or simulation is impossible?

Face

Let us take a look at the bilateral nasogenian grooves that appear in the Shroud. They appear asymmetrical and are especially visible in the right side. The nasogenian and nasolabial folds are creases that appear bilaterally due to the traction of certain facial muscles [15]. This fold is formed when the muscles pull the upper lip in an upward and oblique direction preventing the skin from the cheek and its fat compartment, with its more elastic content, from hanging down onto the skin of the upper lip as age increases (Figure 2A). The older and thinner the person is, the more marked the folds will be.

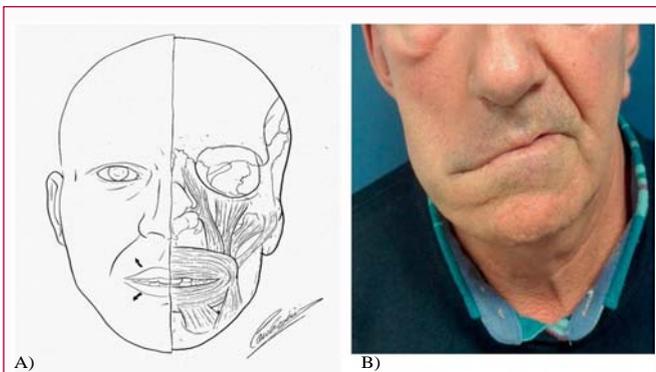


Figure 2: A) Schematic drawing showing the formation of the nasogenian and nasolabial folds due to the activity of the major and minor zygomatic muscles and the elevation of the upper lip and angle of the mouth. The descent of the lower lip is provoked by the depressor *angulii oris* and depressor *labii inferioris*. B) Patient with facial paralysis. Note the deletion of the fold on the right side of the paralysis. The patient has given the consent to use his image.

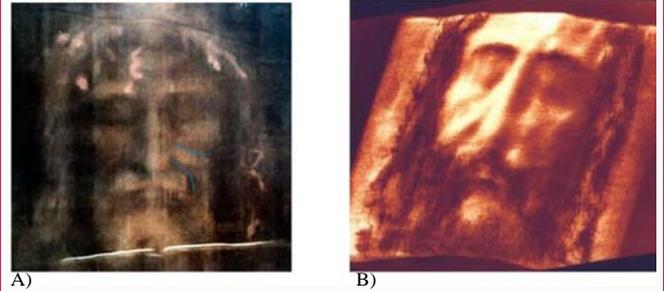


Figure 3: A) Photographic negative of the face of the Shroud of Turin. Note the presence of marked nasolabial folds as well as a second crease superior and parallel to the right nasolabial fold (blue lines). B) 3D image from the VP8 scan of the Shroud of Turin, clearly showing the presence of the nasolabial folds and the right upper sulcus. Images taken from <https://www.shroud.com/meacham2.htm>.

They disappear when there is facial paralysis on the affected side (Figure 2B). When there is bilateral facial paralysis, the two folds disappear. A situation of bilateral facial paralysis appears after death when the tractor muscles relax. Some interesting studies have shown that drooping of nasolabial folds is a sign of impending death due to relaxed tone of the facial muscles. Moreover, multiple studies have demonstrated that changes in nasolabial folds are a physical sign that can be assessed with good inter rater reliability.

As previously explained, in a recent corpse the musculature relaxes and therefore the facial musculature relaxes, the folds disappear (or flatten enormously in people with very deep grooves), the lower lip descends (this descent would be more pronounced if death has occurred in an upright position) and the mouth is open. This is the initial moment of *postmortem* flaccidity. The presence of these creases on the face printed in the Shroud (Figure 3), especially in the right side, initially leads us to think that the person in the Shroud is either alive or his appearance could be justified by a phenomenon of *postmortem* rigidity.

Now we are going to analyze the latter option as the most credible. First of all, there are no corpses that during the *postmortem* flaccid period sharpen the nasogenian folds, let alone when the position of the face is in a vertical situation with the upper and lower lips falling due to gravity, as occurs in a crucified person. If *postmortem* stiffness were the cause of the accentuation of the folds then the tractive muscles of the upper lip could cause the crease, but then the muscles that pull the lower lip in the opposite direction would lower it causing dental exposure so the lips would not appear closed as they do on the Shroud's face. We have carried out a study in the faculty of medicine at our university in which we examined the faces of the cadavers that were received as a donation for the anatomy department, with special attention to their nasolabial folds and the positioning of the lower lip. All cadavers were examined upon arrival, between 24 h to 30 h *postmortem*. Then, we established a comparison with their *premortem* appearance as observed in their ID photograph and the photographs showed by the family during the last year before death. Three independent observers concluded that all cadavers showed an absence of nasolabial folds, which were present in their *premortem* photograph, especially in athletic and leptosomic subjects. Moreover, the lower lip was found to be descended provoking an exposure of the upper teeth.

Furthermore, there is a second sulcus in the Shroud of Turin above the right nasolabial fold that is formed when the tone of the

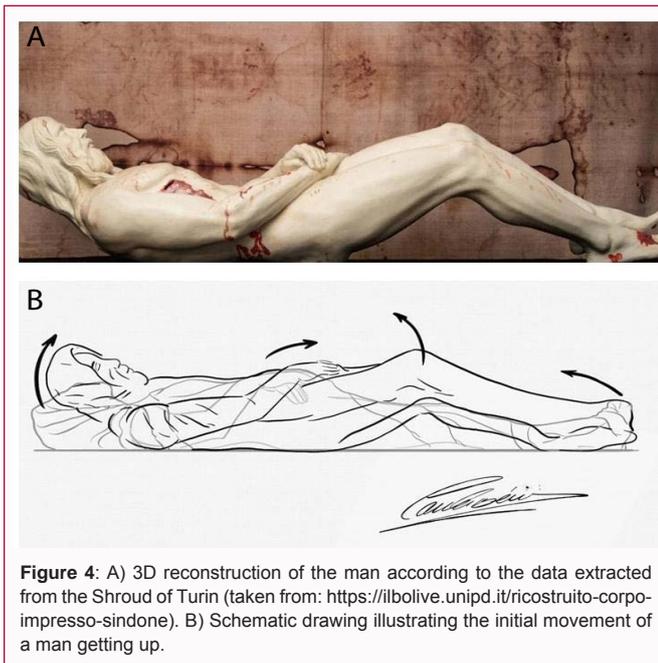


Figure 4: A) 3D reconstruction of the man according to the data extracted from the Shroud of Turin (taken from: <https://ilbolive.unipd.it/ricostruito-corporo-impresso-sindone>). B) Schematic drawing illustrating the initial movement of a man getting up.

tractive facial muscles rises against an inflamed cheekbone. If the person were dead, the relaxation of the nasogenian and nasolabial folds would allow for a more homogeneous inflammation in the cheekbone compartment, so a generalized inflammation of the entire right cheek would be observed, in contrast to the left side, but without the formation of folds. In the case at hand, the facial expression in the Shroud shows both marked nasolabial folds and closed lips. The asymmetrical appearance on the Shroud nasolabial folds seems that the Shroud could be tighten, wrapped around the body and therefore some traction could have been exerted and impress the Shroud on the two halves of the face differently. One could speculate that the Shroud was tightening from upper right aspect of the head to the lower left side. If it were the case then the nasal tip should be displaced to the left as the part of the nose is soft, but we observe the nasal tip centered in the image.

Discussion

Thus, if we assume the possibility that the person of the Shroud is alive, how to explain the disposition of the limbs in the Shroud? This posture may be due to a gesture of getting up. If we take a look at the 3D reconstruction of the 2D image on the Shroud, performed by the University of Padua, we can observe a man with a flexed neck, with the genitalia covered by his hands and an asymmetrical flexion of the knees, which is the typical posture of a man starting to get up without leaning against the floor with his hands (Figure 4).

It has been stated that the thorax of the figure of Turin is in forced contraction and with the hypogastrium contracted [1]. This posture has also been attributed to *postmortem* rigidity [11], but may be indicating a getting up maneuver. Therefore, at the moment the image was produced, there was an inspiration and a contraction of the abdominal muscles, a situation that is contrary to the one immediately prior to death, as described: "But Jesus, again crying out in a loud voice, yielded up his spirit." (Matthew 27:50), which indicates that he expelled the air from the lungs.

There is evidence to suggest that some of the blood deposits in the image precede the development of the image itself [1]. Therefore, both

the *premortem* and *postmortem* blood that impregnate the Shroud could prove that the subject was alive and then died, and after dying the image appeared. Consequently, it is not possible that the body image printed in the Shroud, of a different nature, complementary and not superimposed on that of the blood clot stains, could come from a dead subject.

Now, it is mandatory to make the following reflection: How is it possible that we have inherited all the knowledge of the ancients regarding medicine, chemistry, physics, painting or art and yet there remains this important gap in our knowledge to explain how this extraordinary work represented in the Shroud of Turin was made? Failure to answer this question leaves the intellect on hold. Is it really the body of the risen Jesus? Science does not record the experience of a dead person coming back to life, and therefore it will never be able to follow that step, nor can it explain it. It is a mystery that remains inexplicable at the moment.

Conclusion

The image of the Shroud would correspond to a subject who is getting up and who presents the stigmata of flogging and crucifixion. Following the live signs present in the face of the Shroud image it should be considered that the figure that appears in the Shroud is that of a person who is alive and who is initiating a getting-up movement while in levitation or the gravity appears to have no influence on the body. We can affirm that, whether the Shroud of Turin is true or a representation, what was intended to be shown in that same object is the passion, death and resurrection of Jesus as it is described in the Gospels.

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