

## **World premiere: Pr. Maurice Mimoun tells about the total skin transplant on a severely burned patient**

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Saint-Louis Hospital, Paris. Pr. Maurice Mimoun, Franck and his twin brother

**A 33-year-old man, burned on almost the entire body (95%), and thus doomed to death, was saved thanks to the skin of his twin brother. A medical premiere performed in the service of burn victims of the hospital Saint-Louis, in Paris, led by professors Maurice Mimoun and Alexandre Mebazaa.**

How is this a first?

(Pr Maurice Mimoun) - This is by far the most serious burned patient saved by using the skin of his homozygous twin brother.

Why was this young man admitted to your service in a very serious situation?

First of all, today, for us caregivers, this great burnt man is Franck, a young man who had a good life with his family and his friends and to whom a cataclysm happened. As the progress of his treatment, it was no longer the burned that we saw, but Franck that had to save, absolutely save.

Franck was admitted to the service in September 2016 for a work accident, a very serious and very deep burn. He was touched on almost all of his body: 95% is huge. He had only healthy skin left on his feet and pubic area. Even the back, which has thicker skin and usually burns better, was charred. In this situation, the chances of survival were almost nil.

How did you manage to implement this procedure?

First of all, he had to know that he had a twin brother. Naturally, we would have learned sooner or later, but we had to start the treatment very quickly to hope to succeed. If we had known a week later, it was lost. When his brother, Eric, came to ask me about him, I could not know that he was Franck's twin. Franck was completely disfigured, unrecognizable. If Eric had not said anything to me - and emotionally that might have been the case - we would have missed the deadline. But he said to me, "We are twins, identical twins." A huge hope then took hold of me. A legitimate fight could be fought, to be fought. Time was our worst enemy, we had to act as quickly as possible. There was no question of letting his luck pass.

So you were able to operate Franck as soon as possible?

Yes, but it was not so simple. Several actions had to be carried out simultaneously. First, check that it was homozygous, that is to say from the same egg, what is usually called a "true twin". The twins are very similar and have identical genetic capital. The biological tests confirmed our hopes. The skin taken from Eric would not be rejected on Franck.

Eric, the healthy twin, has he easily accepted to give his skin?

For him, everything was self-evident. He was not only in agreement, but he was a plaintiff.

Were you sure to save Franck?

No. He could not be assured, it was terrible and Eric had to know it. We spent very strong moments, moments of absolute truths, both serious and filled with hope. There was his family, his wife, his friends. They have all been exceptional. It played a lot in the success. The team reassured the family, the family encouraged the team. But all eyes were on Eric, whom no one dared to influence. If there was no word, the looks were not deceiving. The brother had to make his decision, alone. Everything was in his hands or rather in his skin. And he kept saying yes.

How did you explain the procedure?

We had lengthy interviews, all in emergency during the weekend before the transplant. Eric not only said yes as soon as he understood the issue but he pushed for it to be done as soon as possible. He is a hero of modern times.

So you went to the intervention?

Not yet. We had to take another step. In France, healthy donor organ harvesting is regulated, which is fine. We needed permission from the biomedical agency. We were all hooked on this decision, all anxious, but hoping for the best. The twin brother had to be auditioned. He told me he had prepared, it was like a challenge. The agency gave us its positive opinion in record time. Great! Without this agreement, the burned would be dead.

But taking the brother's skin, did you scare him?

Indeed, it was very courageous, because I had explained to him well that there would be marks. He did not care, he wanted to save his brother. It can indeed happen that scars turn bad if we are not careful. In the service, transplants are our daily life, we knew that by a specific technique, we could minimize the risks. Naturally, I did not take her skin on any part of the body.

### Which parts did you take?

In the first place, on the scalp. This always surprises patients because they believe that taking off on the scalp will remove their hair. This is obviously wrong. We have published a series of more than a thousand transplants that proves the reliability of the method. Not only is the grafting not painful, not only can we repeat the operation a few days later, because the regeneration process of the scalp is unmatched, but the hair is back on the skull very quickly because we take the skin without hair bulbs. Especially the levý leaves no mark. The other areas chosen were the back because the skin is very thick and the thighs because these are areas that socially can be covered.

### But how did the twin "donor" heal because you took a large area of skin?

The technique consisted in taking a very thin sheet of skin. The thinner it is, the faster the repair is done, because it leaves a large layer of keratinocytes (cells of the epidermis) that will multiply and replenish the skin. Moreover, the finer the skin is removed, the more discreet the marks are. We have pushed these procedures to the extreme to obtain the greatest finesse.

### How was the intervention?

First of all, it is not an intervention, but a long-term treatment with numerous interventions and a very high level of resuscitation. Eric, the healthy twin, has been operated on the skull, back, and thighs three times, on the seventh day, the eleventh day, and the forty-fourth day. The surgical procedure was very improved and we were able to take ultrathin layers around the tenth of a millimeter allowing extremely fast healing with the lowest marks possible. The scalp healed so quickly that we could take it twice. The two brothers were operated at the same time by two teams of surgeons and anesthetists-intensive care to ensure the immediate transfer of the skin.

### How were the care organized?

It is above all a team work. Success comes from "working together". The whole team was on the bridge, surgeons and resuscitators, of course, but also infectiologists, psychiatrists, psychologists, managers, nurses, nurse anesthetists, band-aids, physiotherapists, nutritionists, social workers, caregivers ... Everyone at his post and in his role for a common goal: to save Franck's life. In this type of pathology, it suffices for one of the links to fail in order for the failure to occur. A lack of attention, a fault of asepsis, a bad evaluation and the fight can be questioned.

### Will these successes lead to improvements in the treatment of more "classic" burns, a burned man does not always have a twin?

Of course, the process remains exceptional but it allowed us to make extraordinary observations. We found that this fast and stable skin coverage had transformed the usual vicious circle of burn victims, local aggravation (deepening of the burn) aggravating the general state into a virtuous circle exactly opposite. The deep intermediate burn zones, which deteriorate due to shock, leading the patient to death, have miraculously improved and healed. These findings will have future implications for the treatment of all severely burned patients. We have clearly demonstrated that if we had a universal skin, we could save the very burned by specific surgical and resuscitation techniques. However, we touch this possibility. This is just another encouragement to look in this direction.

### When did you know it was won?

It took a fortnight for me to allow myself to think that we were going to get there. I dared not say it as if to ward off bad luck. When his brother, his family, his wife, who was there, asked for news, I

forced myself to remain reserved and I tried not to show my enthusiasm. Several times there were vital alerts that seemed to question the fact that the resuscitators were able to contain.

Then one day, Franck spoke. What a magic moment! We are used to hearing the voice of our patients a few weeks after they enter the center when they are better and they are extubated (since they are initially on respiratory assistance). But it was as if I had already spoken to him since I had spoken to his twin. It was strange. I had his double. And the positive signs have been confirmed. We started daring to say that he was going to heal, and then we started to predict his exit, then we talked about rehabilitation ... He stayed a little more than four months in the center. Today, he is at home!

How are you feeling today?

I can only speak for myself, but I think it's the same for all the caregivers, the surgeons, the resuscitators, the paramedics ... It is an incredible honor to say that by its action, we have saved a life that with conventional procedures and procedures should have been extinguished. There is no word. What's great too is that it's a team effort, we cannot do anything alone. We do an incredible job that must be done with humility, because we are sometimes very poor, but with the requirement and the hope of always better. I remember when Franck started walking, the caregivers sent the videos of these first steps as if to say, "It's amazing, it's working." Today, he went home. He is in reeducation. The road is long, but he decided to take the path of life and I'm sure he will continue to win. And then his twin is so happy to have saved his brother. And Franck told him, "Eric, without you, I'll be dead."

Can you tell us a word about Franck's tattoo?

Yes. I do not know if you believe in signs. Franck had many tattoos that disappeared due to the burn. Only a small square of skin has risen. On this square, we read the word "Life". An omen, no doubt.

