Medical Xpress

Brain function involved in recovery of facial paralysis is different according to sex

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Research work drawn up by specialists from the Department of Plastic, Reconstructive and Aesthetic Surgery at the University of Navarra Hospital has shown that, after surgical treatment for facial paralysis through using muscular transplant and nervous transposition (connection of facial muscle to a nerve different from the injured facial nerve), the brain of a woman – in comparison to that of a male - manages to adapt itself better, recovers the spontaneous smile and has a greater time period available for repairing the paralysis.

The research has been under way since 2000 with 114 patients of both sexes with facial paralysis and treated at the University of Navarra Hospital. The results will be published shortly in the internationally renowned specialised journal, *Plastic and Reconstructive Surgery*. The research was undertaken using an own design system, known as Facial Clima, involving capturing movement with infra-red rays.

Better development of cerebral plasticity

According to the conclusions of the study, "the results obtained highlight the relevance that patient gender has when planning strategy for reconstruction in facial paralysis", stresses Doctor Bernardo Hontanilla, Director of the Department. The surgical treatment of facial paralysis involved the specialists from the University of Navarra Hospital making muscular transplants connected to the cruciate facial nerve (the healthy facial nerve, corresponding to the unaffected side of the face) or to the

masseteric nerve, controlling the masseter muscle, responsible for mastication, given that the movement of closing the mouth is similar to that of the smile.

Given the results, the plastic surgeon stated that, "in the female cases a "remapping" of the brain function resulted, in a way that the woman managed the smile movement through using the masseteric nerve, triggered through the area of the brain corresponding to the facial nerve". In this way, the research has shown that "women tend to develop cerebral plasticity (capacity for adapting a cerebral area to new functions) to a greater extent than men", stated the doctor.

Dissociation of movement and spontaneous smile

According to Doctor Hontanilla, when the facial transplant was undertaken with the masseteric nerve, "in the case of women it was observed that they managed to dissociate the smile movement from that of mastication. And this is seen in the movement of the mouth observed with the "Facial Clima" system using infra-red rays". The specialists explained that in this way "women were able to smile, independently of the mastication movement of the mouth, an exceptional situation in which they were using the nerve responsible for mandibular mobility, the masseteric nerve". That is to say, a woman achieves a smile independently of the mastication function.

The differences between genders observed in this study have thus shown that a woman who has undergone reconstruction in order to treat facial paralysis is capable of smiling if she makes the gesture of mastication. "In the case of men patients we observed that there was no dissociation of movement. They smile on effecting the movement of closing the mouth, as in mastication", pointed out the specialist.

But the differences between the two sexes after the surgical repair of

facial paralysis not only affects the dissociation of movement, but also the ability of woman to achieve smiling spontaneously or in an involuntary manner. "Amongst men, nevertheless, we observe that, in a comical situation or event, movement of the mouth to produce the smile was always voluntary", according to Doctor Hontanilla.

Different time periods for functional recovery

The time period available for reconstructing facial paralysis is also different according to gender. Thus, the specialist explained that facial paralysis reconstructions always have a limited amount of time to carry out effective direct neurotisations (connections of the muscle to nerves other that those injured).

"We have shown", pointed out Doctor Hontanilla, "that men have about a year and a half from the beginning of the facial paralysis to be able to neurotise the facial musculature itself, while women have up to four years in order to neurotise or innervate and achieve a situation where these muscles function". In short, the female population shows "a greater defence of the muscular complex as it is susceptible to being re-innervated after a longer period of time".

So, the results from the study showed that "women with between 3.5 and 5 years of complete facial paralysis achieve an acceptable mobility and symmetry of the mouth in repose and when smiling. In the long term, the post-operation evaluation shows good functional and aesthetic results, with a high degree of patient satisfaction".

The principal authors of the research concluded that while "the reanimation of facial paralysis depends on various factors - denervation (the absence of nervous connection) and the concomitant and considerably important muscular atrophy, nevertheless the sex of the patient also plays a relevant role".

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