NATIONAL ACADEMIES
Sciences
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Medicine

# CONSENSUS STUDY

## Principles and Framework to Guide the Development of Protocols and Standard Operating Procedures for Face and Hand Transplants

DioMed Hospital

Tlalpan Team
Por una mano, por una cara.

Dr. Martin Iglesias

# Standardization of Clinical Protocols for Upper Extremity Transplantation

1. **Minimum Function to achieve**

   - Total active range of motion ( inertial sensors, or manual goniometry)
     - 70 % of TAROM
   - Hand Sensibility (Semmes-Weinstein)
     - Diminished protective sensation to normal
   - Grip and pinch strength  (dynamometer)
     - 20 kg grip and 3 pinch
   - Kapandjy test
     - 4

# Standardization of Clinical Protocols for Upper Extremity Transplantation

## 2. Same function rating scales

- DAHS scale
  - Improve at least in 15 points in hand transplantation
  - Improve at least in 30 points in arm transplantation
- Hand Transplantation Score System
  - 81-100 Hand transplantation
  - 61-80 Arm transplantation
- Caroll Test
  - >76 puntos
- Chen scale
  - Grade II Hand transplantation
  - Grade III Arm Transplantation

# Standardization of Clinical Protocols for Upper Extremity Transplantation

## 3. Quality of life assessment scales

- SF 36
- Quality of life scale, which?

# Standardization of Clinical Protocols for Upper Extremity Transplantation

**4. The recipient inclusion/exclusion criteria**

The recipient must be rigidly selected and must not be manipulated, invented, or modified to our needs.

- favorable anatomical structures to guarantee good functionality.
  - High voltage electric shock (minimum anatomical and functional requirements)
  - Avulsion (minimum anatomical and functional requirements)

# Standardization of Clinical Protocols for Upper Extremity Transplantation

**4. The recipient inclusion/exclusion criteria**

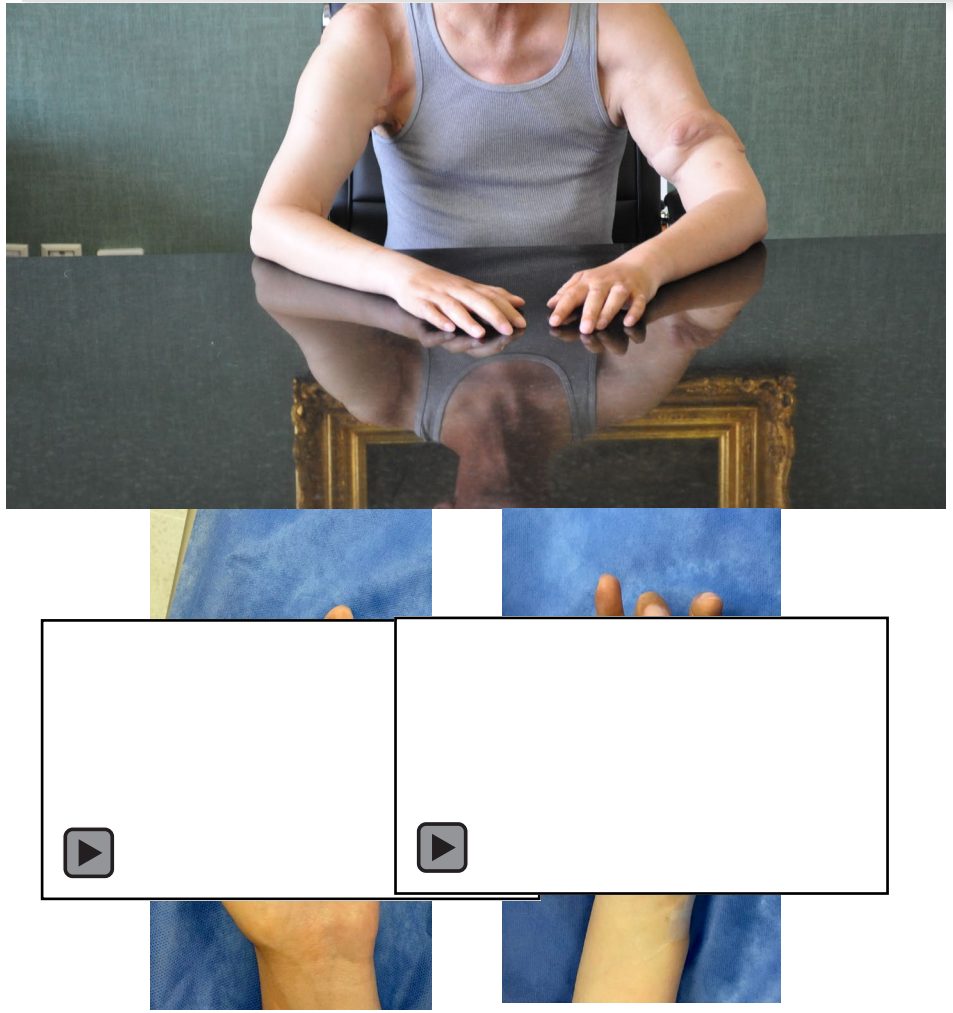
- That recipient/donor, both with  immunological similarity precise analyses of HLA epitopes
  - Induction
  - individualization of maintenance immunosuppression

# Do these clinical protocols need to differ by country or region?

Patient inclusion/exclusion

- Improve epigenetic factors in patients with tendency to develop Diabetes

# Do these clinical protocols need to differ by country or region?



Level of amputation

- Arm

  The reinstatement of physical integrity is more impressive and the gain in function is more valuable than in a hand transplant. Thus, the benefit of function and tissue obtained justifies the risks.

# Do these clinical protocols need to differ by country or region?

Waiting list

- We can only financially support the evaluation of one candidate, and have a patient on the waiting list, transplant him, stabilize him and continue with another.
  México have 1500 arm amputations by year.

# Do these clinical protocols need to differ by country or region?

Economic funds

- Due to the low socio-cultural education of our patients, we need greater expenses for the education of the recipient and their families as well as the nursing staff, than the time and expenses incurred in the countries developed.

# Do these clinical protocols need to differ by country or region?

Social Media

We need the social media (radio and TV, etc) to disseminate the procedure and the results to society.
Only in this way can we pressure the authorities to approve

# Major lessons learned from upper extremity transplantation

The delay in nerve regeneration in total limb transplants causes atrophy of the intrinsic muscles and leads to thinning of the hand. To offer the opportunity for keep muscles with trophicity, and improve the hand appearance, at 5-month post-transplant, we injected the vascular stromal fraction derived from adipose tissue plus micro-fat-grafts in the intrinsic muscles and subcutaneous tissue

5th month post transplantation

ADSVF in hand

**ID:** 0130-0002
**Laboratorio:** Sistema y Servicios Oncológicos de Latinoamérica S.A. de C.V.
**Solicita:** Dra. Mariana Orozco
**Paciente:** Sin especificar
**Edad:** Sin especificar
**Sexo:** Sin especificar

**Fecha de toma de muestra:** Sin especificar
**Recepción de muestra:** 08/05/2020
**Proceso de muestra:** 08/05/2020
**Entrega de resultados:** 12/05/2020
**Muestra:** Células cultivadas
**Código:** Sin especificar

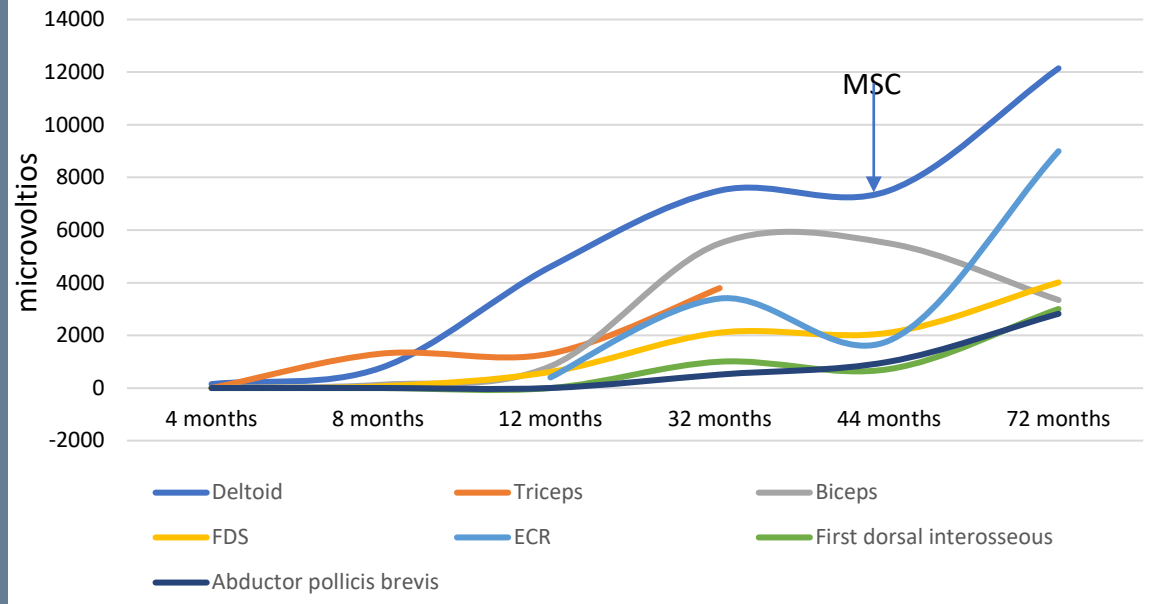
## Citometría de flujo

| Prueba | Porcentaje % | No eventos | Cel/mL |
|---|---|---|---|
| Cuantificación y viabilidad de células Mesenquimales<br>Método: Citometría de flujo | | | |
| Total de Muestra | 95,69% | 19137 | 4820403,02 |
| Viabilidad día 1 | 99,95% | 19127 | 4817884,13 |
| CD34 + | 0,03% | 6 | 1511,34 |
| CD44+ | 99,29% | 18981 | 4781108,31 |
| CD45 + | 0,03% | 5 | 1259,45 |
| HLA-DR | 0,10% | 20 | 5037,78 |
| CD73 + | 99,98% | 19125 | 4817380,35 |
| CD90 + | 99,96% | 19110 | 4813602,02 |
| CD105 + | 99,99% | 19115 | 4814861,46 |
| Perlas | 3,97% | 794 | |

4th month post ADSVF

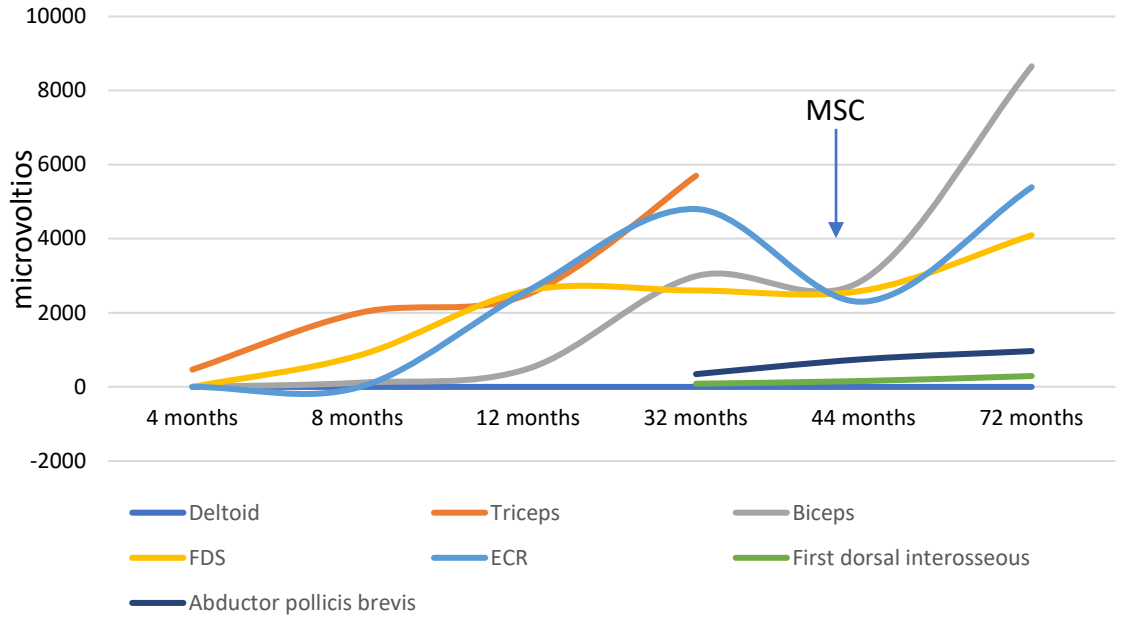
# ARM TRANSPLANTATION

## MUAP on Electromyography Right Upper Limb




# ARM TRANSPLANTATION

## MUAP on Electromyography Left Upper Limb



# Financial and resource support

- Financing is sought by our team and is obtained from Mexican society. The work of specialist doctors and paramedical personnel is altruistic.

# Limiting factors for VCA development

- Authorities' ignorance
- Lack of plastic surgeons interested in VCAs
- Lack of financial funds
- Insufficient social medicine
- Discrimination and social classism

# Thank you

# Publications in a peer-reviewed journal

Original Clinical Science—General

## Bilateral Forearm Transplantation in Mexico: 2-Year Outcomes

Martin Iglesias, MD,[1] Patricia Butron, MD,[1] Mario Moran-Romero, MD,[1] Angel Cruz-Reyes, MD,[1] Josefina Alberu-Gomez, MD,[1] Paulino Leal-Villalpando, MD,[1] Jorge Bautista-Zamudio, MD,[1] Maria Ramirez-Berumen, MD,[1] Euridice Lara-Hinojosa, MD,[1] Veronica Espinosa-Cruz, MD,[1] Rocio Gaytan-Cervantes, PT,[1] Leonardo Bravo-Ruiz, MD,[2] Elizabeth Rodriguez-Rojas, MD,[3] Jaime Ramos-Peek, MD,[4] Miriam Garcia-Alvarez, MD,[1] Felipe Vega-Boada, MD,[1] Juan Sierra-Madero, MD,[1]

Original Clinical Science—General

## Bilateral Proximal Forearm Transplantation: Case Report at 7 Years

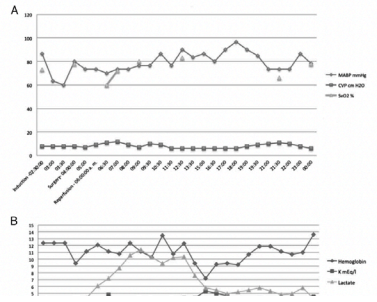
Martin Iglesias, MD,[1] Eliezer Villanueva-Castro, MD,[2] Julio Macias-Gallardo, MD,[3] Josefina Alberú-Gómez, MD,[4] Rafael P. Leal-Villalpando, MD,[5] Jorge Zamudio-Bautista, MD,[5] Victor Acosta, MD,[5] Patricia Butrón, MD,[1] Juan G. Sierra-Madero, MD,[6] Jennifer Cuellar-Rodriguez, MD,[6] Verónica Espinosa-Cruz, MD,[7] Claudia Gómez-Camargo, MD,[8] Mariana Mayorquín-Ruiz, MD,[9] Jorge Vázquez-Lamadrid, MD,[7] Sonia Toussaint-Caire, MD,[10] Judith Domínguez-Cherit, MD,[11] Joel Dorantes-García, MD,[12] Janette Furuzawa-Carballeda, MD,[13] Carlos R. Hernandez-Castillo, PhD,[14] Juan M. Guzmán González, MD,[15] Natalia Castelan-Carmona, PHC,[16] Mayra López-Mártinez, Biol,[16] Norma González-Tableros, Biol,[16] Adriana Arvizu-Hernández, PHC,[16] and Adrián De Santiago-Zárate, PHC[16]

### Severe Complications After Bilateral Upper Extremity Transplantation: A Case Report

A 14-year-old Mexican mestizo female sustained high-tension electric burn, leading to bilateral proximal-third arm amputations. At age 17, the patient and her parents requested bilateral arm transplantation. Our institutional review board for clinical trial approved the surgery. She was healthy with no known drug allergies and her preoperative Doppler echocardiography showed normal cardiac function.

Surgery was performed on June 19, 2010. Two hours before the surgery, the patient was premedicated with methylprednisolone, chlorpheniramine, acetaminophen, and cefuroxime. As induction immunosuppressive therapy, antithymocyte globulin (ATG; 1.5 mg/kg, 90 mg total) was infused into a central vein through a 0.22-μm filter for 6 hr. Her temperature increased to 38°C at 1 hr after induction therapy and remained at this level until 2 hr before the end of the surgery. The parameters recorded during surgery are shown in Figure 1(A) and (B).

The boney fixation was achieved followed by axillary artery anastomosis. Graft reperfusion was uneventful. Bleeding of 1,200 mL was permitted from each axper min without vasopressor, after which her $SvO_2$ increased to 78%. The duration of surgery was 20 hr. The total blood loss was 15,050 mL, requiring transfusion of 45 units of packed red blood cells, 32 units of fresh frozen plasma, and 4 units of platelets.




## Anatomical and Microsurgical Implications in Total and Midarm Transplantation

Martin Iglesias, MD[1] Fernanda Salazar-Hernández, MD[1] María F. Ramírez-Berumen, MD[1] Patricia Butrón, MD[1] Josefina Alberú-Gómez, MD[2] Rafael P. Leal-Villalpando, MD[3] Jorge Zamudio-Bautista, MD[3] Victor Acosta, MD[3] Luis A. Jauregui-Flores, MD[4]

Brain Imaging and Behavior
DOI 10.1007/s11682-017-9683-1

CASE STUDY

## Decoupling between the hand territory and the default mode network after bilateral arm transplantation: four-year follow-up case study

Carlos R. Hernandez-Castillo[1,2] · Jörn Diedrichsen[2] · Erika Aguilar-Castañeda[3] · Martin Iglesias[4]

ELSEVIER

Check for updates

## Functional Outcomes 18 Months After Total and Midarm Transplantation: A Case Report

M. Iglesias[a,*], M. Ramírez-Berumen[a], P. Butrón[a], J. Alberú-Gómez[b], F. Salazar-Hernández[a], J. Macias-Gallardo[c], R.P. Leal-Villalpando[d], J. Zamudio-Bautista[d], V. Acosta[d], L. Jauregui[e], A. Hernández-Campos[a], V. Espinosa-Cruz[f], J. Vázquez-Lamadrid[f], J. González-Sánchez[g], J. Cuellar-Rodriguez[h], J.G. Sierra-Madero[h], R. Gaytan-Cervantes[i], S. Contreras-Barbosa[i], A. Navarro-Lara[i], J. Guzman-Gonzalez[i], J. Domínguez-Cherit[k], M. Vilatoba[b], S. Toussaint-Caire[l], F. Vega-Boada[m], F.J. Gómez-Pérez[n], and M. Mayorquin-Ruiz[o]

ELSEVIER

CrossMark

## Is Mexico Ready for Face Transplantation?

M. Iglesias[a,*], P. Butrón[a], A.I. Osuna-Leal[a], L. Abarca-Perez[a], M.J. Sosa-Ascencio[a], M.A. Moran-Romero[a], A.U. Cruz-Reyes[a], F.J. Pineda-Gutierrez[a], D.A. Leon-Lopez[a], M.N. García-Alvarez[a], J. Alberu[b], M. Vilatoba[b], R.P. Leal-Villalpando[c], J. Zamudio-Bautista[c], V.M. Acosta-Nava[c], and J. Gonzalez[d]

[a]Department of Plastic Surgery, Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Mexico City, Mexico; [b]Department of Transplantation, Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Mexico City, Mexico; [c]Department of Anesthesiology, Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Mexico City, Mexico; and [d]Department of Psychiatry, Instituto Nacional de Ciencias Medicas y Nutricion Salvador Zubiran, Mexico City, Mexico

ABSTRACT

Taylor & Francis

Annals of Medicine

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## Restoration of the donor site in face transplant through reconstruction and printing in third dimension: a form of donor dignity

Reyes González Juan P., Gómez Crespo Salvador, Villanueva Castro Eliezer,

Current Transplantation Reports (2020) 7:237–245
https://doi.org/10.1007/s40472-020-00293-z

VASCULARIZED COMPOSITE ALLOGRAFTS (V GORANTLA, SECTION EDITOR)

Check for updates

## A Multisystemic Approach to Psychosocial Evaluations of Vascularized Composite Allotransplantation Candidates

Anneke Farías-Yapur[1] · Martín Iglesias[2] · Alberto González-Chávez[3] · Guillermo Cantú-Quintanilla[1,4]

Published online: 11 September 2020


Case Report

## Preoperative clinical management of patients who are candidates for facial transplantation

*Manejo clínico pré-operatório de pacientes candidatos ao transplante facial*

MARTIN IGLESIAS MORALES
MATEUS DE SOUSA BORGES
MARIO ROBERTO TAVARES CARDOSO DE ALBUQUERQUE
RODOLFO COSTA LOBATO

■ ABSTRACT

**Introduction:** Face transplantation has gained recognition, changing the clinical-surgical scenario for restoring complex facial defects, as it attributes functional and aesthetic recovery to patients who have suffered serious accidents. At the time of writing this article, in official publications, 43 patients had already undergone facial transplantation worldwide. Face transplantation has numerous pieces of evidence that can irrefutably provide improvements to the patient. For this, preoperative care for the patient must be carefully established so that there is good surgical performance. **Case Report:** Male patient, 46 years old, reports that, at the age of 6, he had burns due to exposure to gasoline, with 72% of his body surface burned, showing sequelae of burns and surgical reconstructions on the face, with redundant and ptotic skin flap on the left cheek, absence of upper and lower lip and exposure of lower teeth. **Conclusion:** It is important to publicize this innovative procedure in different medical specialties and preoperative care through a thorough investigation, which attributes better