

# The first cataract surgeons in Latin America: 1611–1830

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**Abstract:** We strove to identify the earliest cataract surgeons in Latin America. Probably by 1611, the Genovese oculist Francisco Drago was couching cataracts in Mexico City. The surgeon Melchor Vásquez de Valenzuela probably performed cataract couching in Lima by 1697. Juan Peré of France demonstrated cataract couching in Veracruz and Mexico City between 1779 and 1784. Juan Ablanado of Spain performed couching in Veracruz in 1791. Cataract extraction might have been performed in Havana and Caracas by 1793 and in Mexico by 1797. The earliest contemporaneously documented cataract extractions in Latin America were performed in Guatemala City by Narciso Esparragosa in 1797. In addition to Esparragosa, surgeons born in the New World who established the academic teaching of cataract surgery included José Miguel Muñoz in Mexico and José María Vargas in Caracas. Although cataract surgery came quite early to Latin America, its availability was initially inconsistent and limited.

**Keywords:** cataract surgery, couching, history of medicine

## Introduction

Cataract operations have historically included both couching and extraction. Couching is the ancient surgical technique of displacing a cataract from the visual axis. Descriptions of couching by Arabic authors on the Iberian peninsula, such as al-Zahrawi (936–1013), known later as Albucasis, of Córdoba, implied a personal familiarity with this surgery.<sup>1</sup> Despite claims to the contrary,<sup>2</sup> the practice of couching for cataracts likely continued in this region after the 15th century. A case of cataract couching was documented in Spain in 1594.<sup>3</sup> Moreover, in 1623, the optician Benito Daza de Valdés provided detailed descriptions of couching and the spectacles to be used post-operatively.<sup>4</sup> Extraction of cataracts became popular after Jacques Daviel (1696–1762) presented his technique in Paris in 1752.<sup>5</sup>

After Columbus' voyage in 1492, medical practices spread to the New World. In the English-speaking areas of America, cataracts were treated by couching by 1751, and by extraction by 1776.<sup>5</sup> The purpose of this review was to identify early cataract surgeons in Latin America, defined as the areas in which Spanish or Portuguese is spoken. We searched a variety of databases (see Supplementary material). Evidence of cataract surgery can be identified quite early in Latin America (Figure 1). Each year in Figure 1 corresponds with the paper subheadings, which are arranged chronologically.

## Drago in Mexico by 1611

Francisco Drago (or Diego, flourished 1611–1625) was a Genovese “oculista”<sup>6</sup> who couched cataracts (“vafir cataratas”),<sup>6,7</sup> removed pterygia (“extirpar carnosidades”),<sup>6</sup> and treated urinary blockages and hernias. It seems likely that Drago would have been

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**Figure 1** Evidence of cataract surgery in Latin America appears by year. **Note:** E denotes evidence of cataract extraction (as opposed to couching or division).

practicing in Mexico by 1611, because one had to practice for 5 years before taking the “protomedical” examination, which Drago appears to have done by 1616 (Figure 1).<sup>8</sup> In 1616, the viceregal government moved to expel him to Europe because he was a foreigner. Drago did not fight this effort, but the public outcry and the testimony of the “protomédico” on November 4, 1616 that “Drajo” had no equal in the kingdom moved the government to relent.<sup>6</sup> In 1621, because he was the city’s “only and excellent” oculist, the city decided to pay him 200 pesos annually, to defray the costs of treating the poor. He was still practicing in 1625.<sup>9</sup>

As Drago was the only oculist in the region, it seems likely that he operated on the Augustinian friar Francisco Muñoz (died 1616). Because Muñoz had poor vision when he was named the prior of Xonacatepec in 1602,<sup>10</sup> his continued appointment was threatened by a provincial clerical official. Therefore, Muñoz felt compelled to submit to cataract couching by a foreign doctor. The first eye was left moderately healthy (“medio sano”),<sup>11</sup> but the pupil was damaged in the second eye, which was lost.<sup>10</sup> Muñoz was subsequently elected prior of Mexico in 1611.<sup>10</sup>

Even after Drago appeared in Mexico, access to cataract couching was limited. When discussing couching in 1712, the Moravian Jesuit missionary Juan de Esteyneffer noted that in his rural area, now part of northeast Mexico, there were no skilled oculists, but that in such cities as Mexico, there were usually good “officials” for this condition.<sup>12</sup>

Even toward the end of the 18th century, it is not clear that cataract surgery would have been commonly incorporated in the training of local surgeons. During the 1780 competition for the post of professor of the Escuela de Cirugía in Mexico, only the candidate who had trained in Spain at the Colegio Real de Cádiz was asked about cataract surgery.<sup>13</sup> The two locally trained candidates<sup>14</sup> were instead asked about “the new operations for lacrimal fistula”.<sup>13</sup>

### Vásquez in Lima by 1697

In 1568, King Felipe II established the Real Tribunal del Protomedicato in Peru. The examination cost 39 pesos for doctors and surgeons, but 19 pesos for oculists.<sup>15</sup> Melchor Vásquez de Valenzuela (1660–1714) appears to have been an esteemed surgeon in Lima, Peru.<sup>16</sup> He practiced at the Hospital de San Andrés,<sup>17</sup> and was teaching at the Real Universidad de San Marcos by 1681.<sup>17,18</sup> Vásquez was the Catedrático Regente de la Cátedra de Vísperas de Medicina and Primario Protomédico in 1711.<sup>19</sup>

A completely different picture of Vásquez emerges from the satirical poetry of Juan del Valle y Caviedes (1645 to ~1697).<sup>19</sup> Vásquez’s neighbors in the Calle Nueva considered him so dangerous that they posted a sign to warn others.<sup>19</sup> His mother, Elvira, was a traditional healer and possibly the inspiration for the street of the same name in colonial Lima.<sup>19</sup> Two potentially fictional associates are mentioned only by Caviedes: Vásquez’s “quack” brother Elviro, and Leandro de Godoy, an Indian oculist (“cirujano cura-tuerto”). Vásquez was accused of shooting at Leandro but missing. In “To a doctor who cured the cataracts [las cataratas] and blinded them worse than they were before”, after mentioning Vásquez, Caviedes wrote:<sup>19</sup> “... to puncture the cataracts, the pupil [la niña] of the eye you puncture. But who having the chance, to penetrate the pupils [las niñas] would refuse?”

### Peré in Veracruz by 1779

Juan Peré (flourished 1779–1794) was a Paris-trained surgeon who arrived in Mexico in 1779. He was born in Pau, in southwest France. After his training, he traveled in the service of the Spanish monarch to Santo Domingo, before arriving in Veracruz to work at the Hospital de San Juan de Montesclaros.<sup>20</sup> Peré indicated that while on Santo

**Figure 2** Juan Peré was required to report cases in which he performed cataract couching (“operación de batir cataratas”).

Domingo, he performed the “delicate and meticulous cataract operation [la delicada prolija operación de las chacaratas], through which restoration of the sight to many blind has been achieved”.<sup>20</sup> He was instructed to travel to Mexico City for an examination, and did so after some delay, due to a smallpox epidemic. In 1781, he asked to serve in Mexico City. While there, he demonstrated his cataract operation at the Hospital Real de los Naturales. Cataract extraction, as opposed to couching, is suggested by the interest of his colleagues in a “meticulous” operation, and is plausible for a surgeon who trained in Paris following Daviel’s 1752 presentation. Nonetheless, in 1781, a government official mandated that Peré report any instances in which he performed the “operación de batir cataratas” (Figures 2 and 3).<sup>21</sup> While this mandate may not reflect his full surgical capability, we cannot credit Peré with introducing cataract extraction into Latin America. Peré continued to work at the Hospital de San Juan de Montesclaros in Veracruz until 1794.<sup>20</sup>

### Ablanedo in Veracruz by 1791

Joaquin Alonso Ablanedo Arajava (flourished 1791–1820) was a graduate of the Real Colegio de Cádiz and was selected by the director in 1787 to serve on a military expedition to the New World. The director deemed Ablanedo unsuitable for service in the navy with long sea voyages, but thought he could do well in the army. After departing from Cádiz in January 1788, Ablanedo was initially stationed in Mexico City.<sup>22</sup> In 1790, Ablanedo diagnosed the naturalist José Longinos Martínez with “tercianas dobles”, a fever perhaps due to malaria,<sup>23</sup> and certified that a prisoner held for desertion in the Real Cárcel de Corte was suffering from leprosy.<sup>22</sup> In 1791, while in Veracruz, Ablanedo performed a couching for a long-established membranous cataract on a postal official of Veracruz.<sup>24</sup> Ablanedo also performed a

**Figure 3** Signature of Juan Peré of France.

lithotomy. Ablanedo then served in Cuba before periods practicing in New Orleans (1794–1795 and 1802–1805)<sup>22,25–28</sup> and New Spain (by 1796 onwards),<sup>22</sup> including service at the Hospital Real de San Carlos in Veracruz (1807–1810).<sup>22,29</sup> Believing that his poor health was related to the climate at Veracruz, Ablanedo retired, returned to Spain in 1813, and died in 1820.<sup>22</sup>

### Extraction in Caracas by 1793

The establishment of the protomedicato in Venezuela in 1777 specified that the protomédico regulated oculists.<sup>30</sup> The subsequent March 1793 Arancel issued in Caracas by Protomédico Felipe Tamariz included a surgical fee schedule that listed 50 pesos for “extraer la catarata” (extraction) and 25 pesos for “abatirla” (couching).<sup>30</sup> Cataract surgery continued in Caracas with the return of José María Vargas in 1825.

### Rivas in Havana in 1793

On June 6, 1793, in the newspaper “*Papel Periódico*” of Havana, the physician Fernando Rivas of Rome advertised both couching and extraction of cataracts (“la operación de batir, o extraer las cataratas”).<sup>31</sup>

### Longinos in Mexico in 1795

José Longinos Martínez Garrido (1756–1802)<sup>32</sup> was a native of Logroño, near Calahorra, Spain,<sup>33</sup> who practiced surgery in Madrid. In December 1786, his victory in a botanical competition earned him the spot as the naturalist for the royal scientific expedition of New Spain.<sup>34</sup> Longinos arrived in Mexico in the summer of 1787.<sup>33,35</sup> Unfortunately, he frequently suffered illness in the New World. His quarrels with his peers and with the expedition director, Martín Sessé,<sup>34</sup> were handled by sending Longinos away, first to California and then to Guatemala. Longinos argued that because he sought animal specimens, he could not search in the areas of value to the expedition botanists.<sup>33</sup>

Longinos established a museum of natural history in Mexico, even though Sessé viewed it as a distraction from the expedition. In April 1790, Longinos announced its imminent opening in the *Gazeta de México*, though he anticipated some delay because he had been ill for 4 months.<sup>34</sup> His creation was incorporated into the museum at Chapultepec Palace in 1798.<sup>34</sup>

Longinos asked the viceroy for permission to take leave from the expedition in May 1789, due to illness and the death of his wife.<sup>34</sup> In May 1790, Ablanedo diagnosed Longinos with “tercianas dobles”, a fever perhaps due to malaria.<sup>36</sup>

In January 1791, Longinos left the capital to explore California.<sup>33</sup> The viceroy sent him with the expedition pharmacist, who all agreed was incompetent.<sup>34</sup> Longinos' observations related to ethnography, animals, and plants, including traditional medicinal uses.<sup>32,33</sup> Longinos journeyed as far as Monterrey, and was back in the Mexican capital by January 1794.<sup>34</sup>

One source of friction with the director was that by about 1789, Longinos began practicing medicine and surgery in Mexico City.<sup>34</sup> He found that cantharis beetle applied topically to soldiers affected with pneumonia was curative.<sup>33</sup> Some historians claim that Longinos performed cataract surgery in Mexico.<sup>34,37,38</sup> Our review suggests that Longinos advocated cataract extraction in principle, perhaps because of his training in Madrid. Nonetheless, we did not find evidence that he actually performed cataract surgery in the New World. Longinos managed conservatively the traumatic cataract which developed in 1794 in Carlos Barrón, an attorney from Zacatecas.<sup>39</sup> Another of his patients, José Joaquín Lecuona, the general treasurer of income from tobacco, powder, and cards, was rendered blind from cataracts in both eyes in December 1793.<sup>40</sup> Longinos managed Lecuona medically for more than a year.

In June 1795, Longinos was instructed to explore Guatemala. However, he asked for a delay of several months, because spring and autumn were the most appropriate seasons to operate on Lecuona's cataracts.<sup>40</sup> On June 27, 1795, Lecuona himself petitioned the "fiscal" of the Real Hacienda for a delay until Longinos could operate and manage the postoperative period, because there was no one "in the kingdom who could execute the extraction [la extracción] and it is this operation which is most perfect in this category".<sup>40</sup> This petition was immediately denied, in part because a procedure could be done by another surgeon who had carried out a similar surgery on a functionary in Veracruz and would pass through Mexico on his way to interior provinces.<sup>40</sup> This description might fit Ablanado, or perhaps Perú or Quiñones. Longinos was ordered to leave Mexico on June 29, 1795. He did so in July,<sup>33</sup> and arrived in Guatemala City (formally Nueva Guatemala de la Asunción) on June 6, 1796.<sup>40</sup> He was to be accompanied by the Mexican botanist and physician José Mariano Mociño, though the two traveled separately.<sup>34</sup>

It is tempting to speculate that while in Guatemala, Longinos' advocacy of cataract extraction might have influenced the surgeon Narciso Esparragosa. The intellectual community in the capital city was tightly knit. For instance, as late as 1820, there were still only 18 physicians in the entire nation of Guatemala.<sup>9,35</sup> The intellectuals founding the progressive

Sociedad Económica de Amigos del País in October 1795 included Esparragosa, his mentor José Felipe Flores, and the editor of the *Gazeta de Guatemala*.<sup>40</sup> Longinos was essentially an honorary member of the Sociedad Económica,<sup>35</sup> which granted him a diploma of "socio de mérito" and sponsored and promoted his projects,<sup>35</sup> including the Museum of Natural History, which he established in Guatemala.<sup>33</sup> The inauguration of this museum and botanical garden on December 9, 1796 was a citywide festival, attended by the captain general and the archbishop, and accompanied by orchestral music.<sup>35,40,41</sup> Longinos was present, of course,<sup>40</sup> and it would not be surprising if Esparragosa were present as well.

Longinos and Esparragosa shared a student in Mariano Antonio de Larrave, who obtained a bachelor's degree in 1795 and by July 20 of that year was a medical student at the Hospital de San Juan de Dios.<sup>38</sup> At the same hospital, Flores was the physician and Esparragosa the chief surgeon.<sup>38</sup> Larrave was attached to Longinos' expedition as a student,<sup>38</sup> and at the museum inauguration Larrave submitted to academic questioning by Mociño.<sup>35</sup> In March 1798, the *Gazeta* reported that Larrave underwent an examination in surgery under Esparragosa at the Real y Pontificia Universidad de San Carlos de Guatemala.<sup>35,38</sup> Larrave also defended his thesis under Esparragosa in July.<sup>9,38</sup>

After a brief sojourn into the field from January to July 1797, ended by worsening "asthma", Longinos remained in the country of Guatemala, and in the city itself through 1799,<sup>40</sup> collecting specimens, directing the museum, and educating the public about botany.<sup>33</sup> He died of tuberculosis in Campeche in 1802.<sup>40</sup> His legacy is not only his journal and the two museums of natural history but possibly also advocating cataract extraction in Latin America.

## Esparragosa in Guatemala in 1797

Narciso Esparragosa y Gallardo (1759–1819)<sup>42</sup> of Venezuela earned a degree in philosophy from the University of Caracas in 1785, where one of his classmates was Felipe Tamariz.<sup>42,43</sup> Esparragosa began medical studies there, but in 1788 moved to Guatemala, where he had a rich uncle,<sup>42</sup> and completed his medical studies at the University of San Carlos in 1789 (Figure 4).<sup>38,43</sup> Esparragosa studied under Flores,<sup>35</sup> and was the first to earn a medical degree in Nueva Guatemala.<sup>42</sup> Esparragosa was serving at the Royal Hospital de San Juan de Dios as early as 1791.<sup>35</sup>

After Longinos arrived in Guatemala City, Esparragosa began performing cataract extractions. On November 22, 1797, Esparragosa demonstrated for the Sociedad Económica the first three operations for cataract extraction ("operaciones



**Figure 4** Narciso Esparragosa y Gallardo, who performed the first contemporaneously documented cataract extractions in Latin America in 1797.

**Notes:** Copyright © 1945. Editorial Universitaria. Reproduced from Duran CM. *Las Ciencias Médicas en Guatemala: Origen y Evolución*. 2nd ed. Guatemala: Tipografía Nacional; 1945.<sup>38</sup>

de extraer las cataratas”): bilateral surgery on Juan José Alvarez, aged 18 years, absolutely blind for 5 years, and the left eye of Analecta Arias, aged 40 years, blind for 8 years. The long duration of blindness points to the lack of availability of cataract surgery. The members of the society verified that the patients were able to distinguish the colors and classes of objects placed before them. The two were presented to the general public to permit verification. The notice reported that this difficult operation was done in the “most cultured countries of Europe”.<sup>44</sup>

On January 21, 1798, Esparragosa restored the vision of Antonio Palacios, aged 70 years, who was frail, had small, sunken eyes, and had long-standing blindness. The operation in his left eye succeeded. The patient was presented to the secretary of the society, who verified that the patient could distinguish objects as expected for such an elderly man. The professor offered to cure others blinded by cataracts.<sup>45</sup>

His student Pedro José Molina underwent a surgical examination in 1802. Molina praised extraction over couching.<sup>35</sup> Rather than the original extraction technique of Daviel, which enlarged the keratome incision with right- and left-curved scissors, Molina favored the technique of

Georges de la Faye (1699–1781). de la Faye introduced the first cataract knife, in 1752, and the first cystotome.<sup>2</sup> The knife had a rounded cutting edge, which permitted the incision to be made without scissors.<sup>2</sup> Molina also described the instruments of Pierre Guérin (1740–1827) and Demours.<sup>35</sup> In 1769, Guérin described a device that completed the cataract incision by means of a spring when placed on the eye.<sup>2</sup> Guérin also used an Anel syringe to inject intraocularly a mixture of two-thirds water and a third alcohol to irrigate cortical remnants.<sup>2</sup> Although the father, Pierre Demours (1702–1795) did not operate, in contrast with his son Antoine P Demours (1762–1836), both of them described cataract knives similar to that of de la Faye.<sup>2</sup>

In 1811, the town council cited the importance of cataract surgery as one of the reasons to support the College of Surgery.<sup>35</sup> Interestingly, Molina played a major role in the independence movement, and became president of the new nation in 1823.<sup>46</sup>

In 1798, Esparragosa developed an elastic loop made of whale bristle to provide fetal traction during difficult deliveries.<sup>35</sup> In 1801, he developed a catheter for the removal of bladder stones.<sup>35</sup> Esparragosa was the chair of surgery at the university from 1796 until 1805, when he led the newly formed Royal College of Surgery at the General Hospital in Guatemala City.<sup>35</sup>

In 1802, Mociño forwarded to Esparragosa instructions for smallpox vaccination to be used for publication, as Esparragosa edited medical information in the *Gazeta*.<sup>35</sup> Esparragosa made an attempt at smallpox vaccination in December 1802, but the vaccine had no effect.<sup>35</sup> He performed the first successful vaccinations in Guatemala in May 1804,<sup>35</sup> with material delivered from Havana by a private citizen.<sup>35</sup> Esparragosa vaccinated 9,000 people in 45 days.<sup>35</sup> In 1815, Esparragosa published instructions for the prevention of the spread of the disease.<sup>35</sup> Esparragosa was the protomédico in 1808,<sup>35</sup> and died in 1819.

## Quiñones in Mexico in 1797

Joseph Morales y Quiñones (flourished 1781–1803) began practicing surgery in 1781.<sup>47</sup> He was a professor of surgery in the College of San Fernando de Cádiz<sup>47,48</sup> and a Royal Navy surgeon.<sup>47</sup> Between 1797 and 1803, he performed 182 operations in Mexico City, with eleven failures (6%). By 1803, he claimed to have performed a total of 402 operations in New Spain, with 29 failures (7%).<sup>47,49</sup> His wording is ambiguous, but suggests that the surgeries elsewhere in New Spain (outside Mexico City) might have occurred before 1797.<sup>47</sup> He was the first surgeon in the area of present-day

Mexico known to have performed cataract extraction (“la extraccion de toda catarata”).<sup>48</sup> He advertised that he performed the surgery with just one instrument, in contrast to the five instruments typically used.<sup>47</sup> In 1800, he stated that the surgery took 2 minutes, but by 1803 he claimed to have reduced this time to half a minute.<sup>47,48</sup> The patient experienced less pain than when being bled.<sup>48</sup> Quiñones made his incision with an instrument of “Palucy”. Natale Giuseppe Pallucci (1719–1797) introduced both a couching needle that was withdrawn from the eye with pressure from a spring and a needle knife for extractions.<sup>2</sup>

### **Budet in Puerto Rico by 1801**

In 1801, José María Budet of Toulouse, France requested permission to practice in the faculty of medicine, optics (“óptica”) and obstetrics.<sup>50</sup> In this context, “óptica” might imply eye surgery. Though he had passed all required examinations, his credentials had been intercepted by the enemy English who lurked along the coast. The town council of San Germán issued a report recommending that Budet be permitted to practice on the island, because he was Roman Catholic, had taken an oath of fidelity, and no other doctors on the island had these skills.<sup>50</sup>

### **de Oliveira in 1803 in Rio de Janeiro**

In 1802 at the Hospital Real Militar e Ultramar in Rio de Janeiro, surgeon José Soares de Oliveira requested cataract surgery instruments. These arrived the next year.<sup>51,52</sup>

### **Extraction in Havana in 1813**

On September 12, 1813, Juan Federico Nissen, a German physician and oculist who had recently arrived in Havana, performed cataract extraction on both eyes of Antonio de la Rosa, a 52-year-old mason originally from a town near Seville, but a resident of Havana for 22 years. Vision had been lost for several years before the surgery. Eight days after the operation, the dressing was removed. At 2 weeks postoperatively, de la Rosa removed the dressing and was able to go out to the street. The newspaper editor verified that with a convex lens, the patient was able to read numbers the size of a pea.<sup>31</sup> Nissen reported performing bilateral cataract extractions in two additional patients in July 1818.<sup>53</sup>

In 1817, an Italian surgeon named José Chiappi (~1763–1833) arrived in Havana. Chiappi had trained in Rome, and then practiced in Spain and the US. He performed “the operation of the cataract, either by depression or extraction”, and could construct “an artificial pupil” (iridotomy)

when necessary.<sup>54</sup> His advertisements depicted a lens loop inserted through a temporal limbal incision.<sup>54</sup> He offered to cure all eye conditions, except those due to “natural blindness” or smallpox. In Cuba, Chiappi again advertised his specialty as diseases of the eyes (“enfermedades de los ojos”),<sup>55</sup> and specifically cataract operations.<sup>53</sup> Chiappi was well known for producing detailed wax sculptures for both entertainment and anatomic education.<sup>55</sup>

The Havana newspapers also reported cataract surgeries performed by Juan T Gorman in 1827 and 1828.<sup>53</sup> In 1830, Jorge Domingo Busquet announced that he was willing to operate on cataracts in the poor at no charge.<sup>53</sup>

### **Machado in 1816 in São Paulo**

In 1816, Francisco Alvares Machado de Vasconcellos (1792–1846) of São Paulo performed his first cataract surgery: a successful extraction (“extracção da catarata”) on a 54-year-old named Francisco Dias da Silva.<sup>56</sup> Machado learned surgery in São Paulo from Mariano João (or José) Leite do Amaral,<sup>57</sup> who trained in Coimbra.<sup>58</sup> Machado had to visit several blacksmiths to have surgical instruments crafted.<sup>57</sup> In 1840, Machado became the president of the province of Rio Grande do Sul (Figure 5).<sup>59</sup>

### **Muñoz in Mexico by 1816**

José Miguel Muñoz González (1779–1855) was born in Mexico City (Figure 6).<sup>60</sup> When he was 12 years of age, his father died, and he took a job repairing umbrellas. At age 16 years, following his mother’s death, he apprenticed with a barber.<sup>14</sup> In 1798, Muñoz obtained a license to perform phlebotomy.<sup>14,61</sup> He performed minor procedures in a store on the Calle del Rastro.<sup>14</sup>

Muñoz took advantage of an 1804 law that permitted licensed phlebotomists to become surgeons by passing an examination.<sup>14</sup> He also trained at the Real Escuela de Cirugía. This school enabled upward mobility, because training was free.<sup>14</sup> Ordinarily, students trained for 8 years, divided evenly between classes and clinical internships.<sup>14</sup> The Hospital Real de Indios supported the Real Escuela de Cirugía financially, and provided internships.<sup>14</sup> Muñoz graduated as a surgeon in 1807.<sup>14</sup> Surgeons generally had a lower status than their medical colleagues, but in 1831, when surgery merged with medicine in Mexico, Muñoz remained at the top of his profession.<sup>14</sup> His family employed two servants.<sup>14</sup>

Muñoz taught himself to extract cataracts using cadavers at the Hospital Real de Indios and live sheep.<sup>14</sup> Of course, eye surgeries were performed without anesthesia during this period. Muñoz invented and presented to the Escuela de



**Figure 5** Portrait of Francisco Alvares Machado de Vasconcellos (1792–1846).  
**Note:** Courtesy of the Biblioteca Nacional, Rio de Janeiro, Brazil.

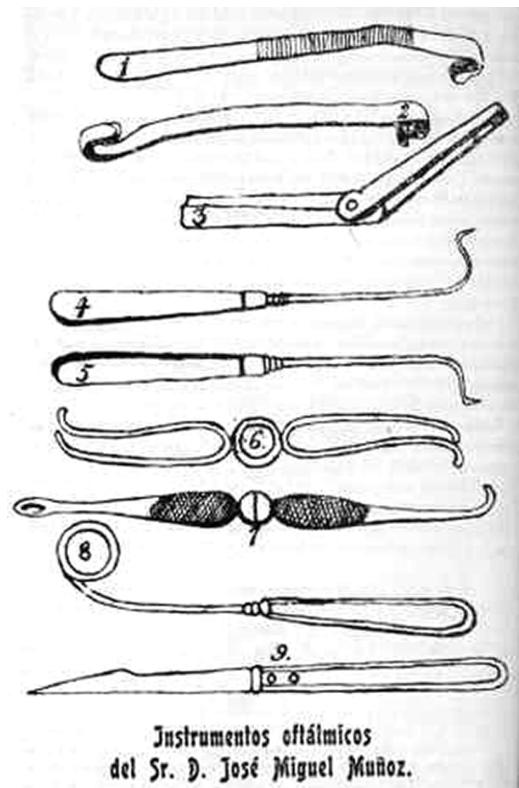
Cirurgía a chair for extracting cataracts (“un banquillo para extraer cataratas”).<sup>62,63</sup> The chair immobilized the patient, permitting the operation to be completed quickly, while keeping the patient and the surgeon comfortable.<sup>62</sup> By 1816, he had used the chair to operate at no charge on eight poor persons who completely recovered their vision.<sup>9</sup> Muñoz also invented a cataract knife and eyelid speculum (Figure 7).<sup>60,64</sup> Despite performing extractions, he still did couchings occasionally.<sup>64</sup> Muñoz’s successors viewed him as the father of ophthalmology in Mexico.<sup>64</sup> They knew that a Spaniard had preceded Muñoz in performing cataract surgery in Mexico, but could not remember Quiñones’ name.<sup>64</sup>

In 1804, Francisco Xavier de Balmis led a worldwide expedition to distribute the smallpox vaccine, and made Muñoz “conservador de la vacuna” in Mexico, a post he held for 4 decades. Muñoz was responsible for preserving the vaccine.<sup>61</sup> He personally performed smallpox vaccinations between 1804 and 1810.<sup>62</sup> Between 1810 and 1828, over 40,000 children were vaccinated for smallpox in the capital.<sup>61</sup> In 1829, Muñoz participated in the committee for



**Figure 6** José Miguel Muñoz González of México.<sup>59</sup>

vaccination, and in 1830 published steps to prevent transmission in children.<sup>61</sup> In 1842, he transferred the responsibility for overseeing vaccinations to his son, Luis Muñoz, a professor in the school of medicine.<sup>14,61</sup> The elder Muñoz frequently attended deliveries,<sup>14</sup> and in fact assisted during the labor of the emperor’s wife in 1822.<sup>61</sup>



**Figure 7** Cataract-surgery instruments of José Miguel Muñoz.<sup>59</sup>

The Mexican War of Independence (1810–1821)<sup>65</sup> produced numerous amputees. Muñoz was the “honorary first assistant” of the military surgical corps.<sup>9</sup> In 1816, he successfully applied to the viceroy for a patent on a prosthetic leg of his own invention (Figure 8).<sup>9,63</sup> The leg permitted the wearing of a shoe, appeared to move naturally without placing pressure on the stump, would not be apparent below “a fine silk stocking”, and could even be used for dancing.<sup>9</sup> At a time when most European prostheses were made of wood, this metal prosthesis contained perforations to avoid a buildup of moisture.<sup>62</sup> By 1816, the prosthesis was already being used by a man from Mexico City.<sup>9</sup>

In 1838, Mexican president and general Antonio López de Santa Anna was injured by a cannon fired by the French at Veracruz. His left leg developed gangrene and was amputated. One of the prosthetic legs received by Santa Anna was designed by Muñoz.<sup>61,66</sup>

## Vargas in Puerto Rico by 1817

José María Vargas (1786–1854) was born in La Guaira, now part of Venezuela (Figure 9).<sup>67–69</sup> He graduated as a physician from the Universidad Real y Pontificia de Caracas in 1808.<sup>62,68</sup> He began practicing medicine, but also became involved in the movement for Venezuelan independence, for which he spent most of 1813 in prison.<sup>68</sup>

In late 1813, he was released by rebels, and immediately set off for Europe for medical training, first in Edinburgh and then in London.<sup>68</sup> There, he was appointed to the Royal College of Surgeons, and was awarded a diploma of “surgeon–oculist” at an eye hospital.<sup>69</sup> He also trained in France.<sup>69</sup>



**Figure 8** Design of a metal prosthetic leg, from the 1816 patent application of José Miguel Muñoz.



**Figure 9** Portrait of José María Vargas, by Martín Tovar y Tovar.

In 1817, he arrived in the Puerto Rican capital of San Juan.<sup>70</sup> On the island, he categorized the flora and fauna and established a botanical garden.<sup>67</sup> In about 1819, Vargas performed an enucleation (“la extirpación del ojo”) in Dominga Rios on a 14-year-old with left-eye pain from “un fungus hematodes”, which most likely described a tumor. This is the first surgical enucleation in Latin America with which we are familiar.<sup>67</sup> (Although some sources state that the explorer Diego de Almagro had an enucleation, it seems that he lost his eye from an arrow, rather than surgery.)<sup>71</sup>

An 1823 account of practitioners in the capital identified Vargas as a physician, surgeon, dentist, and “oculista”.<sup>50</sup> In 1824, he operated on a man’s maxillary tumor. The patient also noted halos around lights, but another “Dr Greek” attributed this symptom to cataract. Postoperatively, the patient developed a lacrimal fistula, which Vargas also treated surgically.<sup>67</sup>

Vargas may not have been the only cataract surgeon in Puerto Rico. In 1829, Puerto Rico, the surgeon Francisco Oller set a fee schedule that mentioned 200 pesos for cataract surgery, 60 pesos for enucleation (“la amputación de un ojo”), and 32 pesos for pterygium.<sup>50</sup>

Vargas returned to Caracas in 1825.<sup>71</sup> At the university, he taught a course and published a manual on ophthalmology.<sup>67</sup> Vargas definitely performed couching. His surgical equipment included the needles for couching (“abatir la catarata”) of Beer, Richter, Scarpa, Adams, and Saunders.<sup>69</sup> Vargas once operated on a cataract that had ossified and resisted the needle.<sup>72</sup> In a 48-year-old man who sustained a white cataract

following a childhood injury, Vargas dilated the pupil and considered depression and extraction, but instead elected to perform the discission operation of John Cunningham Saunders (1773–1810). The needle was used to rupture the lens capsule. On the third day, the upper half of the cataract was absorbed, and the patient was able to count fingers.<sup>67</sup>

Vargas was undoubtedly familiar with cataract extraction, but we do not know how often he performed the procedure. He had a forceps to extract (“extraer”) pieces of opaque capsule. His surgical instruments included a corneal knife (“cuchillo”), and the keratome (“cuchillo keratótom”) of Wardrop, which Vargas indicated were for evacuation of aqueous humor in cases of ophthalmia.<sup>69</sup> Vargas considered extraction of a traumatic cataract, as noted earlier,<sup>67</sup> and mentioned that the aqueous humor reformed after cataract extraction (“extracción de la catarata”).<sup>72</sup>

Vargas’ practice extended well beyond cataract surgery. His lecture notes in anatomy were published in 1837 and 1847.<sup>68,72</sup> He used modern medical equipment, such as a microscope<sup>68</sup> and a stethoscope.<sup>69</sup> Vargas also had equipment for operating on lacrimal fistulas, and Maunoir’s scissors for forming artificial pupils (iridectomies).<sup>69</sup> His description of glaucoma as having a fixed, blue-green pupil (“azulado y opalescente”), and a sclera and cornea that are rigid (“rígidos”)<sup>72</sup> is typical of the period, and consistent with angle-closure glaucoma.<sup>73,74</sup> Vargas described eye exercises for a patient with strabismus.<sup>67</sup> He also described a 30- to 35-year-old man, who was a slave, with right eye ptosis, amaurosis, and mydriasis who was found at autopsy in 1829 to have a pituitary tumor.<sup>67</sup> He also described the course of a 66-year-old man found at autopsy to have a lacrimal tumor.<sup>67</sup> Vargas operated on a conjunctival cyst in a 10-year-old boy who was a slave.<sup>67</sup>

His inaugural speech to the surgical class of 1832 observed:

... and there is no longer a shortage in the principal cities of Venezuela surgeons who return to the light the unfortunate man who from a *gutta serena* or cataracts had been condemned to pass the rest of his days buried in darkness. What sweet satisfaction is that of restituting a useful man to his occupation, the care of his family, and societal relations!<sup>69</sup>

Vargas’ contributions extended well beyond clinical practice. He was elected rector of the Universidad Central de Venezuela in 1827.<sup>67</sup> Vargas eliminated religious and racial barriers to medical education.<sup>68</sup> In 1829, he was appointed the first director of the newly formed Sociedad Económica.<sup>68</sup>

In 1835 and 1836, he served as the second president of Venezuela.<sup>68</sup> After 1852, his health declined, and he traveled to New York, where he died in 1854.<sup>68</sup>

## Fitzgerald in Mexico by 1822

Edward Fitzgerald (“Fitz Geraldo”; flourished 1812–1834) of Ireland, a physician, surgeon, and oculist, arrived in America in about 1812. He traveled to “el mas rico Puerto” (perhaps Puerto Rico), Cuba, and “Costa firme”,<sup>39</sup> corresponding with present-day Honduras and Nicaragua. He arrived in Mexico in about 1821, and practiced in Durango and Zacatecas.

An attorney named Barrón sustained trauma to the left eye in 1789 and developed a cataract in 1794, which worsened in 1814.<sup>39</sup> Barron was evaluated by Longinos, as noted earlier, and also by Muñoz.<sup>39</sup> Finally, in 1824 Fitz Geraldo performed a surgery that took only 2 minutes.<sup>39</sup> A reoperation was required the next day for “additional humor”, perhaps residual lens cortex.

Fitz Geraldo claimed to have performed 150 operations in Puebla and eight in Zacatecas.<sup>39</sup> In 1823, the town council of Lagos de Moreno reported that Fitz Geraldo, a “presumed oculist”, intervened surgically in ten patients, leaving two patients improved, but eight worse than before.<sup>75</sup> Fitz Geraldo then left town without notice.<sup>75</sup>

Fitz Geraldo was aware of the technique of extraction, and advertised that he used the methods of his “peers”, the “immortal geniuses” Saunders and William Adams.<sup>76</sup> Fitz Geraldo once encountered a man aged over 60 years in the street who had developed poor vision at age 14 years and blindness at age 18 years. With the patient standing against a wall and Fitz Geraldo also standing, he:

... effectuated the permanent destruction of the cataract and its capsule with a scalpel in the left eye, and later with the left hand the extraction (*extracción*) of the opaque body in the right eye with the same instrument.<sup>77</sup>

The patient was able to distinguish the colors and identities of objects placed before him.

One 57-year-old woman of Tepecuacuilco developed dense cataracts in both eyes. In 1826, she traveled to Mexico, where she was referred to a professor who promised to restore her vision surgically for 100 pesos. However, she was disconsolate to learn that the professor (perhaps Muñoz) had learned how to perform the operation by dissecting a cadaver in a hospital and a dog’s eyes.<sup>78</sup> Therefore, although Muñoz’s successors were justifiably proud that he taught himself,<sup>64</sup> his competitors highlighted this fact to his disadvantage. The alarmed patient found Fitz Geraldo, who operated in 5 minutes, allowing her to see objects the next day.<sup>78</sup>

Fitz Geraldo treated conditions besides cataracts. He cured a 30-year-old woman who had a vascular tumor the size of a large orange in the right orbit.<sup>79</sup> He also treated a cancerous ulcer of the tongue and a growth on the neck.<sup>39</sup> In 1828, he advertised “medicinal cigarettes”, which he invented for asthma.<sup>80</sup>

On August 5, 1831, Fitz Geraldo was arrested and imprisoned.<sup>81</sup> While in prison, he advertised that he could still attend to patients.<sup>82</sup> The authorities suspected that Fitz Geraldo’s ideas triggered Juan Alvarez to carry out the *Revolución del Sur*, a Zapatista revolt, in the future state of Guerrero.<sup>83</sup> It seems that Fitz Geraldo was still in custody in early 1832,<sup>84</sup> but released and still seeing patients by 1834.<sup>85</sup>

## Oldivar in Mexico in 1825

José Luciano Fremour de Oldivar (flourished 1825–1828), who styled himself as a professor of medicine and surgery, and an oculist, was a native of Puebla de los Angeles. He practiced in France, England, and the US. In 1825, he traveled from the US to his home country after a “forced” absence of 29 years, and settled in the city of Mexico.<sup>86</sup>

In 1826, “Doctor Oldivar” represented himself as a Mexican officer to a Texas settler from Missouri who was importing tobacco and other contraband aboard the schooner *Escambia* to the Lavaca River territory.<sup>87,88</sup> Oldivar promised to help sell the contraband, but was suspected of betraying the settler’s confidence when Mexican authorities soon arrived, seized the contraband, and made arrests.<sup>87,88</sup> The incident foreshadows the larger conflict between the English-speaking Texans and Mexico. In June 1828, Oldivar got married in San Pedro, south of the Rio Grande.<sup>89</sup>

## Hockin in Mexico in 1825

William Hockin (flourished 1810–1826) of England first advertised in the city of Mexico in 1825.<sup>90</sup> Hockin was the nephew of William Adams of England (1783–1827), under whom he studied for 8 years at the West of England Eye Infirmary, in London, and in Dublin. Adams in turn had been a student of Saunders.<sup>91</sup> Adams generally preferred to break up cataracts with a needle, leaving the pieces in the anterior chamber, although he would sometimes perform a secondary operation to extract the lens remnants if they failed to be absorbed.<sup>91</sup> Adams also described surgery for ectropion.

In April 1809, Hockin watched Adams treat a 33-year-old man with a chronic pulmonary disorder, who developed bilateral uveitis and miosis and posterior synechiae. Perhaps the patient had sarcoidosis. Belladonna had been unsuccessful in enlarging the pupil. Adams surgically opened the pupil

and broke up the lens, leaving the pieces in the pupillary aperture, where they were absorbed. The patient saw well enough to resume working as a shoemaker.<sup>91</sup>

In December 1809, Hockin assisted Adams in the formation of an artificial pupil (iridotomy) in a man who had an iris incarcerated in the wound following cataract surgery. The opening was successfully created, but the man’s vision remained poor, due to a retinal disorder.<sup>91</sup>

In 1811, Hockin performed postoperative care for a 9-year-old girl with bilateral capsular opacification, treated surgically by Adams.<sup>91</sup> In Dublin, Hockin assisted in creating an artificial pupil, with placement of lens remnants in the opening to prevent closure of the opening.<sup>91</sup>

Following his training, Hockin directed the ophthalmic hospital of Cork, Ireland for 7 years.<sup>92,93</sup> Hockin might have been encouraged to journey to Mexico by his uncle, who studied Mexican silver mines because of his relatives’ investments.<sup>94</sup>

## Surgery along the Río de la Plata by 1825

In Buenos Aires, the decree of Viceroy Nicolás Francisco Cristóbal del Campo, the marquis of Loreto, issued November 27, 1786 and published March 3, 1787, set a price of 19 pesos and 9 reals for the “examen de oculista”.<sup>95</sup> The medical particulars of the decree were likely determined by the acting protomédico, Miguel Gorman, who was born in Ireland.

Cataract surgery was present along the Río de la Plata in the early 19th century. A soldier in Buenos Aires diagnosed with cataracts in 1817 was given 1 month’s medical leave. When the condition persisted, “a radical cure” was considered.<sup>96</sup>

More definitive evidence comes from the case of Dámaso Antonio Larrañaga, a 54-year-old priest who had become “blind” from cataracts. Larrañaga was living in Montevideo on July 19, 1825, when one of his eyes underwent cataract surgery, allowing him to see the smallest objects.<sup>97,98</sup> Unfortunately, he was again reported to be blind in 1827.<sup>98</sup>

The area was visited by the surgeon Squier Littell Jr (1803–1886) in 1825 (Figure 10). In the early 1820s, Littell had trained in Philadelphia under Joseph Parrish,<sup>99</sup> who performed cataract surgery by couching and by division, in the manner of Adams.<sup>100</sup> Littell also preferred division over couching, and felt extraction was the least practical, even though he knew of preoperative pharmacologic dilation.<sup>101</sup> Littell sailed for South America in June 1825, and arrived in Buenos Aires, by way of Montevideo, on August 22, 1825.<sup>102</sup> Littell attempted to establish himself over a period of several months, first in Buenos Aires and then in Guayaquil.<sup>103</sup> Having no success, he returned



**Figure 10** Portrait of Squier Littell.

**Notes:** Inscribed on reverse "Dr S Littell, October 21, 1824, painted by Francis [Martin] Drexel. Courtesy of Matthew Richards.

to Philadelphia, where he became known as a prominent ophthalmologist.<sup>103</sup> It is not known if Littell performed eye surgeries in Latin America.

In 1843, bilateral cataract surgery was successfully performed in a 1-year-old by Carlos Furst and Saxild of Buenos Aires, with the assistance of a ship's physician, Hornemann, from the *Ørnen* of Denmark.<sup>104</sup> Congenital cataract surgery was beginning to become more commonly performed in Europe and the US.<sup>105</sup>

In 1838, Victor Bruland (1817–1895) of France was appointed as a professor in Toulouse, which was staffed by the Montpellier faculty.<sup>106,107</sup> He traveled to South America, and was appointed as a professor in Montevideo in 1843.<sup>106</sup> It has been postulated that Bruland might have performed the first cataract extractions in Uruguay.<sup>108</sup> In 1844, he moved to Buenos Aires.<sup>106</sup> Bruland's successful cataract surgery on Nicolás de la Colina, who had been blind for 5 years, was reported in the province of La Rioja in November 1860.<sup>106,107</sup>

In September 1865, Daniel Iturriós reported performing cataract extractions in two patients in Buenos Aires.<sup>109</sup> Additional eye surgeries were reported by Iturriós in March 1866.<sup>110</sup> On January 22, 1865, Iturriós performed an extracapsular extraction of the soft cataract in one eye of Jorge Batista, a young man who had lost vision at age 10 months due to bilateral cataracts. The doctor considered the surgery a success.<sup>110</sup>

A second eye surgery involved Maria de la Cruz, aged 70 years, who had previously undergone bilateral cataract

extractions. In one eye, chronic inflammation had produced anterior synechiae. On March 5, 1866, Iturriós performed an iridectomy. Iturriós performed both surgeries in homes, used instruments crafted by Francisco Bonino, and was assisted by his mentor Teodoro Alvarez,<sup>110</sup> who has conventionally been credited as the first to perform cataract extractions in Argentina.<sup>111</sup>

## Vargas in Colombia in 1827

In 1827, Leon Vargas (flourished 1823–1833), a surgeon from Charalá, performed the earliest known cataract surgery in Colombia.<sup>112</sup> The needle was fashioned by a blacksmith from San Gil.<sup>112</sup> Vargas had studied under Pierre Paul Broc (1782–1848) of France, who arrived in 1823 and taught at the Hospital de San Juan de Dios in Bogotá.<sup>113</sup> By 1831, Vargas had contracted syphilis from cutting his hands during anatomic dissections.<sup>113</sup> Vargas was said to have died young, presumably by 1833, when he was no longer listed among current practitioners.<sup>113</sup>

## Overview of cataract surgery before 1830

Overall, 26 of 34 cataract surgery patients (76%) were men.<sup>10,24,31,39,44,45,47,48,53,56,67,77,78,98</sup> It is not known if surgeries in men were simply more likely to be recorded. Three of 34 patients (9%) before 1830 developed cataracts in childhood, though none were congenital or were operated on during childhood.<sup>39,67,77</sup> In ten of 34 patients (29%), the cataracts were stated to have been present for years, which points to the inconsistent availability of the procedure.

## Conclusion

Cataract couching arrived quite early in Latin America, probably by 1611. However, only a handful of cataract couchers can be identified in Latin America before 1793. Cataract extraction was advertised in Havana and listed in a Caracas fee schedule in 1793, and might have been performed in Mexico before 1797. The earliest contemporaneously documented cataract extractions in Latin America were performed by Narciso Esparragosa in Guatemala in 1797. In addition to Esparragosa, American-born surgeons who established the academic teaching of cataract surgery included José Miguel Muñoz in Mexico and José María Vargas in Caracas. All three were entrusted to perform smallpox vaccinations.

The cataract surgeons we identified were all men. Migrant surgeons came from a variety of countries in Europe. Some surgeons born in the New World had instruments manufactured locally. Many were general surgeons, and made

contributions outside medicine. Some were scientists, political leaders, or revolutionaries. Before the 19th century, especially, cataract surgery was not consistently available in Latin America.

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## Supplementary material

### Search strategy

We searched for “oculista OR catarata” AND the date range (1492 to 1830) AND relevant place names (eg, Mexico, Cartagena, Lima, Cuba) in several databases: Hemeroteca Nacional Digital de Mexico,<sup>1</sup> Caribbean Newspapers, Series 1, 1718–1876,<sup>2</sup> PubMed, [archive.org](http://archive.org), Google Books, Google Scholar, Biblioteca Nacional Digital ([www.bn.br](http://www.bn.br)), and [hathitrust.org](http://hathitrust.org). Books with titles containing “historia” AND “oftalmologia” AND relevant place-names were obtained. Manual searches were conducted of the archives of the

colonial hospitals of Buenos Aires at the Archivo General de la Nación (Argentina) and the Instituto Histórico de la Ciudad de Buenos Aires. When required, original archival material was obtained.

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