Trends in the Use of Neurotoxins and Dermal Fillers by US Physicians

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Introduction

• The demand for minimally invasive cosmetic procedures (botulinum toxin, dermal fillers) has become increasingly popular.

• American Society of Plastic Surgeons: (2000 to 2012 statistics report of cosmetic use)
  • 680% increase botulinum toxin type A (6.1 million procedures in 2012)
  • 205% increase: soft tissue fillers (2.0 million procedures in 2012)

• Preference to use specific products may be multifactorial and include cost, personal experience, potential adverse effects, and patient preference

• Goal: to characterize trends in the usage of aesthetic products, specifically the use of botulinum toxins and dermal fillers, by US physicians.
Method

- Survey of the National Ambulatory Medical Care Survey (NAMCS)
- To evaluate the use of dermal fillers and neurotoxins in the United States outpatient setting.
- Data from the 1993 to 2010 NAMCS surveys were used.
  - All visits at which a dermal filler or neurotoxin was mentioned
  - The reason for the visit was a “collagen injection” or “botox injection”
  - ICD-9 codes were used to determine the cosmetic visits.
  - Visits to orthopedic outpatient clinics were excluded (likely not cosmetic)
- Data was analyzed separately for 1993 to 2001 and 2002 to 2010
  - The first neurotoxin approved in 2002
  - The first hyaluronic acid approved in 2003.
**Result:**

**From 1993 to 2010 estimated annual visits:**

- 600,000 (95% CI: 210,000–980,000) a filler was administered
- 620,000 (95% CI: 160,000–1,100,000) a neurotoxin was administered.

**Visits likely to be cosmetic:**

- 1993 to 2010, 100,000 (95% CI: 60,000–140,000) dermal filler

Neurotoxin cosmetic visits were first identified beginning in 2002 to 2004

- 2002 to 2010, 440,000 (95% CI: 260,000–610,000) annual visits mentioning a neurotoxin
- 2002 to 2010, 140,000 (95% CI: 90,000–180,000) annual visits mentioning a dermal filler
Estimated cosmetic visits where specific dermal filler products were mentioned from 1993-2010:

<table>
<thead>
<tr>
<th>Visits at which a filler was mentioned</th>
<th>Total estimated visits</th>
<th>Percent of visits for a specific product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collagen</td>
<td>730,000</td>
<td>100</td>
</tr>
<tr>
<td>Zyderm</td>
<td>170,000</td>
<td>23</td>
</tr>
<tr>
<td>Zyplast</td>
<td>10,000</td>
<td>1</td>
</tr>
<tr>
<td>Hyaluronic acid</td>
<td>610,000</td>
<td>100</td>
</tr>
<tr>
<td>Restylane</td>
<td>410,000</td>
<td>67</td>
</tr>
<tr>
<td>Juvederm</td>
<td>150,000</td>
<td>25</td>
</tr>
<tr>
<td>Captique</td>
<td>50,000</td>
<td>8</td>
</tr>
<tr>
<td>Calcium hydroxylapatite</td>
<td>200,000</td>
<td>100</td>
</tr>
<tr>
<td>Radiesse</td>
<td>200,000</td>
<td>100</td>
</tr>
<tr>
<td>Poly-L lactic acid</td>
<td>160,000</td>
<td>100</td>
</tr>
<tr>
<td>Sculptra</td>
<td>160,000</td>
<td>100</td>
</tr>
</tbody>
</table>

The most common filler was Collagen 41.6% for the entire study period:

100% of visits from 1993 to 2001
15.9% from 2002 to 2010
Percent of (a) dermal filler visits and (b) neurotoxin visits at which a specific product was mentioned at cosmetic visits from 2002-2010.

From 2002 to 2010,

1. Hyaluronic acid fillers were the most common (50%)
2. Calcium hydroxylapatite filler (16.1%)
3. Collagen 15.9%

The leading neurotoxin was onabotulinumtoxin A (87.1%)

<table>
<thead>
<tr>
<th></th>
<th>Total estimated visits</th>
<th>Percent of visits†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Visits at which a filler was mentioned</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyaluronic acid</td>
<td>610,000</td>
<td>50</td>
</tr>
<tr>
<td>Calcium hydroxylapatite</td>
<td>200,000</td>
<td>16.1</td>
</tr>
<tr>
<td>Collagen</td>
<td>190,000</td>
<td>15.9</td>
</tr>
<tr>
<td>Poly-L lactic acid</td>
<td>160,000</td>
<td>13.0</td>
</tr>
<tr>
<td>Hydrogel</td>
<td>60,000</td>
<td>5.0</td>
</tr>
<tr>
<td>Unspecified “generic” filler</td>
<td>50,000</td>
<td>4.1</td>
</tr>
<tr>
<td><strong>A) Visits at which a neurotoxin was mentioned</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OnabotulinumtoxinA</td>
<td>3,430,000</td>
<td>87.1</td>
</tr>
<tr>
<td>AbobotulinumtoxinA</td>
<td>30,000</td>
<td>0.8</td>
</tr>
<tr>
<td>Botulinum toxin type unspec.</td>
<td>230,000</td>
<td>5.9</td>
</tr>
</tbody>
</table>
The top diagnosis for both dermal filler (44.3%) and neurotoxin (50%) visits: Other specified hypertrophic and atrophic conditions of skin.
### Dermal filler:

- **Gender:** 48 Y old, Female/Male: 6
- **Race:** Caucasian/African American: 7

### Neurotoxin:

- **Gender:** 50 Y old, Female/Male: ~17
- **Race:** Caucasian/African American: 54

### Most patients (dermal filler or neurotoxin):

- Female, Caucasian
The proportion of dermal filler visits from 2002 to 2010:

- The proportion of hyaluronic acid use has not significantly changed.
- The proportion of collagen injection
  - Peaked from 1999 to 2001
  - Declined by
  - 5% annually from 2002 to 2010
  - 8% annually for the entire study
- Among botulinum toxins:
  - OnabotulinumtoxinA was the leading product injected, with no change in proportions
Use of dermal filler among specialty:

• Dermatologists (45%) most common
  • Otolaryngology (2%)
  • Ophthalmology (1%)

• Other specialties that are not distinguished by NAMCS (53%)
  • Includes Plastic surgery
Use of neurotoxin products for cosmetic purposes among specialty:

- Dermatologists (37%) the most common
  - Otolaryngology (4%)
  - Ophthalmology (2%)
  - Neurology (1%)
  - General surgery (1%)

- All other specialties that are not distinguished by NAMCS (56%)
Discussion

- Increasingly patients are opting for less invasive options when considering cosmetic procedures.

- Of the approved neurotoxins during 2002 to 2010
  - OnabotulinumtoxinA approved in 2002 was used at the majority of visits 87.1%
  - AbobotulinumtoxinA approved in 2009 used at only 0.8% of visits (Only one year)

OnabotulinumtoxinA continues to be the neurotoxin of choice

- Provider’s preference (may be due to their familiarity with one product)
- OnabotulinumtoxinA was the only available for several years.
- Have to familiarize themselves with abobotulinumtoxinA (difference and dose equivalences)

- AbobotulinumtoxinA may have more longevity than onabotulinumtoxinA. Other studies have been inconclusive in favoring one over the other (Diffusion and spread seems to be dose dependent)
Discussion

- Collagen was the only filler (1993 to 2001)
- Dermatologists were more likely to use collagen (1993 to 2010)
- Collagen use has declined 8% annually
  - Data is in line with statistics reports by the American Society of Plastic Surgeons (6% decline from 2011–2012, and 88% decline from 2000–2012)
- HA fillers introduced in 2003, they have become the favored filler product, used at 50%
  - HA fillers lasted longer and required less product compared to collagen
- Calcium hydroxylapatite filler (second most common, approved in 2006), was Superior to collagen (longevity, less volume of product, less injections)
- Restylane, the first approved HA filler, was most commonly used, followed by Juvederm, may be because Restylane has been available longest and providers are most familiar with it.


