

# A Comparative Analysis of 2 National Breast Reconstruction Surveys: Concerns Regarding Autologous and Microsurgical Breast Reconstruction

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**Background:** Pertinent findings of two national breast reconstruction (BR) surveys from two different institutions at two separate times (2012 vs 2010) were analyzed for comparison.

**Methods:** An appraisal of sampling methodology, sample demographics, years of practice, practice affiliation, BR type, and annual volume between the two studies was conducted using statistical analysis.

**Results:** Proper sampling technique and adequate sample size were used in both surveys to represent the typical population of general US plastic surgeons practicing BR. There were no differences in mean age or years of practice between the sample population in both studies. The percentage of plastic surgeons with academic affiliation was higher in the 2012 survey compared to the 2010 survey (28% vs 18%,  $P < 0.05$ ). Implant-based BR was the predominant method among surveyed plastic surgeons in both surveys. There was a substantial decrease in the proportion of plastic surgeons performing  $>20$  cases per year in the 2012 survey compared to the 2010 survey ( $P < 0.05$ ). A high volume of BR, defined as  $>60$  cases per year in the 2010 survey and  $>20$  cases per year in the 2012 survey, correlated significantly with academic practice and multidisciplinary cancer centers, respectively ( $P < 0.05$ ). There was a significant decline in the percentage of plastic surgeons performing microsurgical BR from 2010 to 2012 (35% vs 25%,  $P < 0.05$ ).

**Conclusions:** Comparative data suggest that there are fewer high volume BR cases being performed by US plastic surgeons and that there has been a reduction among plastic surgeons in the use of microsurgical BR from 2010 to 2012. We believe that these findings may indicate early signs of the changes in BR trends in the US. (*Plast Reconstr Surg Glob Open* 2014;2:e158; doi: 10.1097/GOX.000000000000100; Published online 29 May 2014.)

Survey studies using self-reported responses have provided satisfactory data to generate an overview of practice patterns in relation to various plastic surgery procedures.<sup>1-6</sup>

Kulkarni et al<sup>7</sup> reported on a national survey of US plastic surgeons that investigated surgeon and

practice characteristics with a special emphasis on autologous and microsurgical breast reconstruction (BR). The data obtained by the survey were presumably reflective of BR practices in 2012.

In 2010, we performed a national survey of active members in the American Society of Plastic Surgeons

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Received for publication November 5, 2013; accepted March 27, 2014.

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DOI: 10.1097/GOX.000000000000100

(ASPS) to ascertain trends and practice patterns in BR.<sup>8</sup> A comparative analysis was conducted between 2 national surveys to capture similarities and notable changes regarding BR practice from 2010 to 2012.

### METHODS

First, we noted that proper sampling technique and adequate sample size were used in these 2 surveys to allow appropriate statistical analysis.

Second, we examined sample demographics, such as age, gender, and years of practice, of 2 surveys. There were no differences in mean age (*t* test, *P* = 0.95) or years of practice (chi-square test, *P* = 0.2) between both studies' sample populations (Table 1).

Finally, we analyzed the surveys regarding practice affiliation, BR type, and annual volume. However, we ensured that this comparative analysis was made to provide a meaningful perspective.

#### Statistical Analysis

An assessment of differences/similarities between the 2 survey studies was conducted using the *t* test for continuous variables and the chi-square test for categorical variables. Results were considered statistically significant when the *P* value is less than 0.05.

### DISCUSSION

In the survey by Kulkarni et al,<sup>7</sup> a substantial decrease was noted in the proportion of plastic surgeons performing > 20 cases/year compared with the 2010 survey. There was also a discernible increase in the percentage of plastic surgeons performing 1–20 cases/year in the 2012 survey compared with the 2010 survey<sup>8</sup> (Table 2).

The identified change may reflect a trend toward the reduction in the number of BR procedures. According to the ASPS data, there were 5% and 2% decreases in the number of BR procedures for 2012<sup>9</sup> compared with 2011<sup>10</sup> and 2010,<sup>11</sup> respectively. Decline in annual volume may also indicate that BR procedures are still not the dominant procedure. BR was the sixth reconstructive procedure according to 2011 and 2012 ASPS statistics.<sup>9,10</sup>

In the study by Kulkarni et al,<sup>7</sup> the average response by procedure was 79% for tissue expander/implant-based reconstructions (Table 2). Surgeons with a low volume of BR (<5 cases/year) performed

**Table 1. Sample Demographics of 2 Surveys**

Sample Demographics	Survey by Kulkarni et al <sup>7</sup>	Survey by Gurunluoglu et al <sup>8</sup>	<i>P</i>
No. respondents	325	358	
Mean age of respondents ± SD	50.6±8.8	51.0±9.27	0.95
Sex			
Male	271 (87.4%)	290 (81.1%)	0.01
Female	39 (12.6%)	71 (19.9%)	
Years of practice			
≤10	26.5%	27%	0.20
11–20	44%	38%	
>20	29%	35%	
Practice affiliation			
Solo	53.6%	43.7%	0.6
Group	46.4%	33.6%	
Academic affiliation	28%	18%	0.001

implant-based reconstruction (IBR) for more than 90% of their patients. The surgeons with the highest volume of breast cases (>20 cases/year) reported performing IBR for about 70% of their patients. In the 2010 survey,<sup>8</sup> 82.7% of plastic surgeons reported predominantly performing IBR irrespective of the volume of BR or practice setting.

These findings were also in accordance with the National Surgical Quality Improvement Program<sup>12</sup> database and ASPS statistical data. Also, a study<sup>13</sup> demonstrated that the number of IBR increased 11% per year from 1998 to 2008. During the same period, it was also noted that the number of autologous reconstructions decreased 5% per year.

The most recent 2012 ASPS data revealed that IBR comprised the vast majority (70.4%) of BR.<sup>14</sup> In addition, the ASPS statistical data reported a steady increase in the number and percentage of tissue expander/implant-based reconstructions from 2008 to 2012.<sup>10,11,14–16</sup>

Advancements in implant technology, absence of additional donor-site morbidity, lesser downtime, invasiveness, and labor intensity have made this option more attractive for the past several years. The trend seems to be further substantiated by the use of acellular dermal matrix, which allows achievement of better results.<sup>8</sup>

Financial considerations may also play a role in the national trend toward IBR. Hernandez-Bousard et al<sup>13</sup> investigated Medicare reimbursement for BR between 2000 and 2010. The reimbursement for IBR remained relatively unchanged, with a decrease of 4% over a 10-year time period, whereas the average reimbursement for autologous reconstruction decreased 17%. Alderman et al<sup>17</sup> displayed that autologous reconstructions have lower reimbursement per operating room hour compared with IBR.

Kulkarni et al<sup>7</sup> identified reimbursements as primary barriers to autologous and microsurgical BR.

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the Denver Health Hospital Authority.*

**Table 2. Data on Annual Breast Reconstruction Volume and Breast Reconstruction Technique Including Microsurgical Type in the 2 Surveys**

Annual Volume	Survey by Kulkarni et al <sup>7</sup>	Survey by Gurunluoglu et al <sup>8</sup>		P
	Percentage of Respondents	Percentage of Respondents		
1–20	61.8%	31.9%		<0.0001
>20	38.2%	68.1%		<0.0001
Breast Reconstruction	Mean % of Respondents ± SD	Unilateral (% of Respondents)*	Bilateral (% of Respondents)*	
Tissue expanders/implants	79.0% ± 29.3	66.8%	82.4%	NA
Pedicle TRAM flap	13.8% ± 19.3	12.3%	4.2%	NA
Free TRAM flap	2.8% ± 10.3	5.8%	3.8%	NA
Latissimus dorsi flap	9.2% ± 16.9	4.8%	2.2%	NA
Perforator flap (DIEAP)	3.1% ± 13.9	9.4%	7.1%	NA
Microsurgical	25%	35%		0.006

NA: Statistical analysis was not performed since questions were not asked comparably in the 2 surveys.

\*Percentage of respondents who most often perform implant-based breast reconstruction.

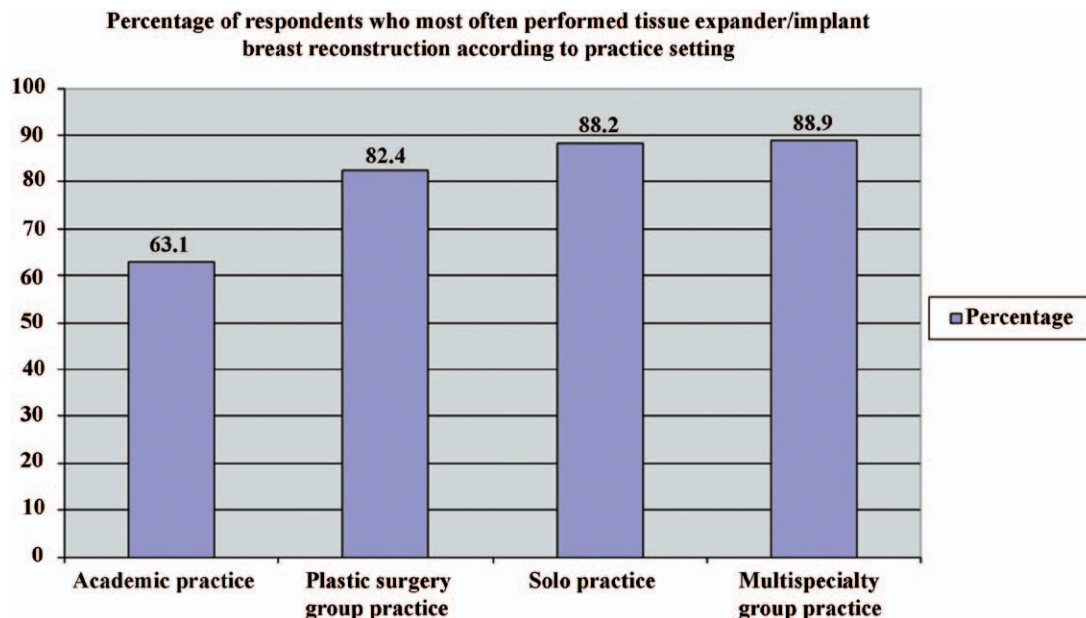
DIEAP, Deep Inferior Epigastric Artery Perforator; TRAM, Transverse Rectus Abdominis Myocutaneous.

Reimbursement patterns and rates are influenced by the American economy.<sup>18</sup> Plastic surgeons have seen a steady decline in fees for reconstructive procedures.<sup>19</sup> These financial disincentives may be contributing to the low use of labor-intensive autogenous tissue procedures.

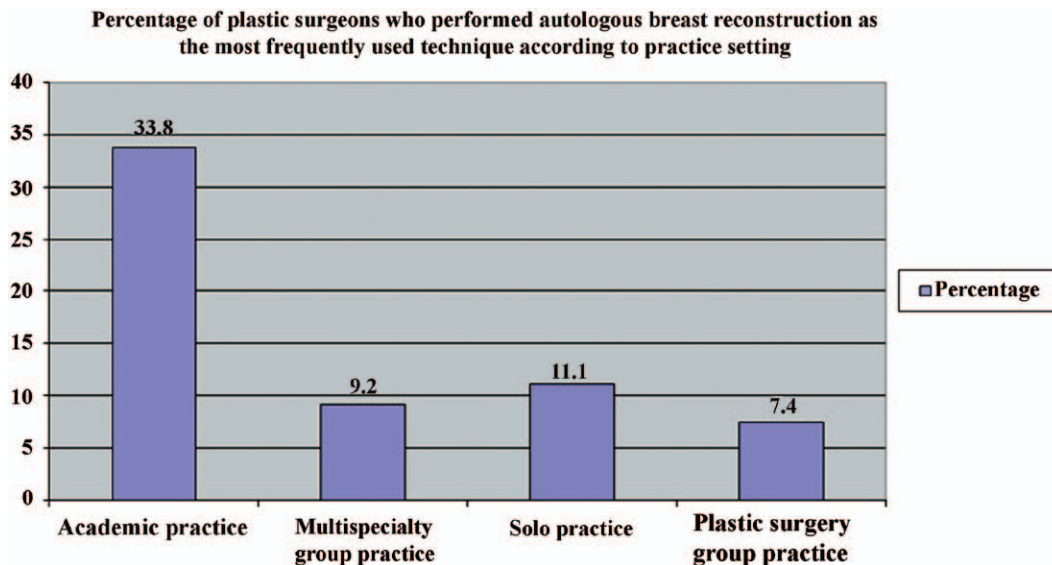
The more labor-intensive autologous BR seems undervalued despite its significant long-term satisfaction. A cost efficiency analysis of implants versus autologous reconstruction found that initial resource costs were lower for implants, but the 5-year total costs were higher.<sup>20</sup> Adoption of a reimbursement program based on long-term outcomes may improve utilization of autologous BR.<sup>21</sup>

In the 2010 survey,<sup>8</sup> plastic surgeons in academic practice preferred IBR less frequently compared with their colleagues in other practice settings (Fig. 1). Furthermore, our previous study indicated that a high volume of BR cases (>60 cases/year) significantly correlated with academic practice.

Kulkarni et al<sup>7</sup> also found that a high volume of autologous BR cases, defined as > 20 cases/year, was significantly associated with the practice affiliation to a multidisciplinary cancer center. The 2010 survey<sup>8</sup> also demonstrated that plastic surgeons in academic settings generally prefer autologous BR more frequently than those in other practice locations (Fig. 2).



**Fig. 1.** Percentage of respondents who most often used tissue expander/implant breast reconstruction according to their practice setting. Academic practice: 63.1% vs multispecialty practice: 88.9%, solo practice: 88.2%, and plastic surgery group practice: 82.4% ( $P < 0.05$ ). Reproduced with permission from Gurunluoglu R, Gurunluoglu A, Williams SA, et al. Current trends in breast reconstruction: survey of American Society of Plastic Surgeons 2010. *Ann Plast Surg.* 2013;70:103–110.



**Fig. 2.** Percentage of respondents who most often performed autologous breast reconstruction according to their practice setting. 33.8% in an academic setting vs 9.2% in solo practice, 11.1% in plastic surgery group practice, and 7.4% in multispecialty group ( $P < 0.05$ ). Reproduced with permission from Gurunluoglu R, Gurunluoglu A, Williams SA, et al. Current trends in breast reconstruction: survey of American Society of Plastic Surgeons 2010. *Ann Plast Surg.* 2013;70:103–110.

Kulkarni et al<sup>7</sup> demonstrated that only one-quarter of plastic surgeons reported performing microsurgical BR as part of their BR practice (Table 2). They observed that a higher annual volume of BR cases, involvement in resident training, cancer center affiliations, and surgeons with microvascular training were associated with the provision of microsurgical BR.

In the 2010 survey,<sup>8</sup> 34% of plastic surgeons reported performing microsurgery for BR (Table 2). Despite the fact that percentage of plastic surgeons with academic affiliation was higher in the 2012 survey than in the 2010 survey, there was a significant decline in the percentage of plastic surgeons performing microsurgical BR from 2010 to 2012.

Our goal was to generate a comparative overview. However, survey studies possess inherent limitations. Both surveys were subject to nonsampling error, including nonbias response, and respondent recall bias. In addition, data were derived from self-report.

### CONCLUSIONS

This comparative analysis identified similarities between two national surveys particularly as they relate to respondent demographics and the most frequent type of BR performed by US plastic surgeons, ie, implant-based BR. Significant changes were also noted; data suggest that there are fewer high volume BR cases being performed by US plastic surgeons and that there has been a reduction among plastic surgeons in the use of microsurgical BR from 2010 to 2012. We be-

lieve that these findings provide meaningful information and may indicate early evidence of the changes in BR trends among US plastic surgeons.

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### ACKNOWLEDGMENT

*We thank Kendra Keene for editing the article.*

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