The purpose of this systematic review was to evaluate the clinical effectiveness of glycine air polishing (GAP) for the maintenance of dental implants with or without peri-implant diseases. Despite the success of implants as a treatment option, like teeth and periodontitis, they are susceptible to peri-implant diseases, which can significantly and rapidly compromise an implant and lead to loss. Peri-implant mucositis defined by the American Academy of Periodontology is a reversible condition classified by inflammation around the soft tissues of the dental implant without signs of bone loss. When bone loss accompanies the inflammation, the condition is referred to as peri-implantitis. The mean prevalence of these diseases respectively ranges from 19 to 65% for peri-implant mucositis and 2 to 47% for peri-implantitis. As a result of peri-implantitis, biofilm is the leading cause of peri-implant diseases, however several factors including the composition of the dental implants, placement/position, residual cement, and other biological factors make implants susceptible to biofilm accumulation and inflammation. Regular professional maintenance and patient education on effective home care are imperative to preventing peri-implant diseases. Therefore, the identification and definition of peri-maintenance and non-surgical therapeutic protocols, coupled with home care protocols for patient education are critical.

Subgingival air polishers (SAP) have been found to be safe and effective in implant maintenance and therapy. SAP are unique in that they use glycine, a water soluble amino acid that has been shown to be effective at removing subgingival biofilm and without damaging implant surfaces. The unique attachment of epithelium to the implant can minimize the iatrogenic damage and discomfort that other therapeutic methods cause. Although studies have shown SAP to be more effective in removing subgingival biofilm, it is unclear if SAP is more superior to other nonsurgical methods in maintaining peri-implant health.

The use of GAP has beneficial effects in the maintenance of dental implants by significantly decreasing BOP, PD, and PI. Furthermore, GAP is effective in non-surgical treatment of peri-implant diseases. More clinical studies are needed to evaluate and develop standards protocols for the use of GAP for the maintenance of dental implants and non-surgical treatment of peri-implant diseases.

**METHODS & RESULTS**

<table>
<thead>
<tr>
<th>Study Design</th>
<th>Groups</th>
<th>Treatment Protocol</th>
<th>Patients</th>
<th>Probing Depth</th>
<th>BOP</th>
<th>PI</th>
<th>Cal. Attachment Level</th>
<th>BL</th>
<th>Bone Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>OHI, traditional</td>
<td>A</td>
<td>Curettes, air polishing w/ varnish</td>
<td>24</td>
<td>5.0 (+0.8)</td>
<td>2.4 (+0.5)</td>
<td>3.5 (+0.8)</td>
<td>94.7 (+9.6) to 84.3</td>
<td>6.5 (+0.8)</td>
<td>21</td>
</tr>
<tr>
<td>OHI, traditional</td>
<td>B</td>
<td>Curettes, sonic debridement and ultrasonic scalers</td>
<td>24</td>
<td>5.1 (+0.9)</td>
<td>3.0 (+0.4)</td>
<td>4.0 (+1.0)</td>
<td>97.8 (+9.4) to 76.7</td>
<td>6.0 (+0.8)</td>
<td>21</td>
</tr>
<tr>
<td>OHI, traditional</td>
<td>C</td>
<td>Curettes, sonic debridement and ultrasonic scalers</td>
<td>24</td>
<td>5.2 (+1.0)</td>
<td>3.0 (+0.4)</td>
<td>4.1 (+1.0)</td>
<td>97.8 (+9.4) to 76.7</td>
<td>6.0 (+0.8)</td>
<td>21</td>
</tr>
<tr>
<td>OHI, traditional</td>
<td>D</td>
<td>Curettes, sonic debridement and ultrasonic scalers</td>
<td>24</td>
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<td>21</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Implant placement is now common place with 500,000 being placed annually in the US. As such, implant maintenance and prevention strategies concerning peri-implant mucositis and peri-implantitis are of great significance. The clinical trials evaluated in this systematic review demonstrated:

- GAP has comparable clinical results to traditional treatment modalities in the removal of subgingival bacterial biofilm.
- GAP has comparable clinical results to traditional treatment modalities in the removal of peri-implantitis.
- GAP to be safe and effective in the removal of bacterial biofilm from dental implants without causing tissue trauma or damage to the implant.
- A statistically significant reduction in BOP when using GAP alone vs. traditional implant instruments.
- A statistically significant reduction in BOP when using GAP as an adjunct to traditional implant instrumentation.
- GAP to be more effective than traditional debridement modalities (ultrasonic, curettes) in the removal of subgingival biofilm in pockets 4-6mm.

**REFERENCES**