Introduction of the Third Hospital of Hebei Medical University

- The Third Hospital of Hebei Medical University was established in 1958. It is a provincial comprehensive Grade A hospital with 1390 staff and 1726 beds. Orthopedics is the national key specialty, along with 8 provincial key specialties.
- Its CSSD is located at the Ground Floor of Department of Orthopedics with an area of 860㎡. It is equipped with 21 staff and advanced facilities, mainly responsible for the processing of reusable medical instruments.

CSSD of the Third Hospital of Hebei Medical University

Research Background

Our hospital is a large comprehensive Grade A hospital, specialized in orthopedics. In 2012, we had 25317 orthopedic surgeries. Bone rasp instruments (e.g. bone rasp, medullary canal rasp, acetabular bone rasp) are the common instrument in orthopedic surgeries. These kinds of instruments are hard to clean and the cleaning quality cannot be guaranteed. So we choose bone rasp, the hardest one to clean, as research object.

Research Method

The whole research lasted for 12month. Took bone rasps received every 3 months as one group. Then we had Group A, B, C and D. All the bone rasps were received within 2 hours after the surgery. Each group used different cleaning methods and then applied visual inspection, 10 times magnifier and ATP test inspection to make comparison of methods and then applied visual inspection, 10 times magnifier and ATP test inspection to make comparison of cleaning efficacy by certain personnel with certain magnifiers under the same illumination intensity.

Cleaning method of bone rasp

- Each group applied different cleaning methods:
  - **Group A:** tap water flushing for 1min + automatic washer
  - **Group B:** tap water flushing for 1min + enzymatic ultrasonic cleaner for 5min+ automatic washer
  - **Group C:** tap water flushing for 1min + enzymatic ultrasonic cleaner for 5min+ manual cleaning+ automatic washer
  - **Group D:** enzymatic pre-soaking for 5 min+ tap water flushing +enzymatic ultrasonic cleaner for 5min+ manual cleaning+ automatic washer

- Personnel of Group C and Group D brushed visible contaminants, then used toothpick to remove skeletal fragment along the grain of bone rasp.

Cleaning Quality Evaluation Method

- **Functional verification** Visually inspected the tooth of bone rasp and checked its functional integrity.
- **Visual inspection** Visually inspected the cleanliness of bone rasp and observed the rasp tooth part especially. No rust, blood, fragment, water scale with bright surface.
- **Illuminant magnifier inspection** Used 10 times magnifier to observe the cleanliness, whose standard was the same as visual inspection. Used toothpick to remove skeletal fragment along the grain of bone rasp in order to check whether there were visible contaminants.
- **ATP fluorescence detection** Used ATP fluorescence detection device and swab to do the test.

Result

<table>
<thead>
<tr>
<th>Cleaning Pass Rate of Bone Rasp by Different Cleaning Methods</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
<th>Group D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Bone Rasp</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Visual inspection passed rate</td>
<td>92%</td>
<td>96%</td>
<td>96%</td>
<td>96%</td>
</tr>
<tr>
<td>Illuminant magnifier passed rate</td>
<td>84%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
<tr>
<td>ATP fluorescence detection passed rate</td>
<td>82%</td>
<td>86%</td>
<td>86%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Discussion

- Different cleaning methods have different cleaning impact due to specially-structured instruments.
- Select more appropriate auxiliary cleaning tools to ensure the fitness of brushing so as to achieve effective cleaning.
- Vibratory cavitation of ultrasonic can remove skeletal fragment from bone rasp, so ultrasonic cleaner can improve the pass rate of bone rasp.
- Multi-enzymatic pre-soaking can facilitate the disassembling of organsics thus improving pass rate.
- Proper cleanliness inspection is beneficial to the quality control of instrument cleaning.

Conclusion

Due to the special structure of bone rasp, they can be embedded with a large amount of skeletal fragment and tissue. Therefore, the normal standard cleaning procedure cannot guarantee cleaning quality. Complete cleanliness can only be achieved when we use tools such as toothpick, soft brush to carefully remove contaminants. We should also combine it with ultrasonic enzymatic cleaning and automatic washer.

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