Introduction
A clinical audit was carried out in the Kingston Hospital Orthodontic department to determine the bracket failure rates for brackets bonded using the conventional bonding method (CM) which was the two-step etch and prime system compared with the Self-Etch Prime system (SEP) bonding system over a 6 month period. The large volume of etch used by clinicians in the conventional bonding system and the cost implications of this were raised in a clinical governance meeting. It was queried was what most cost effective bonding system when breakage rates were taken into account?

Aim
• To assess the departmental bracket failure rates of CM versus SEP bonding systems.

Standard
• Previous studies show the bond failure rates for conventional bonding to vary from 0.54%-17.6%1-8 and for SEP to vary from 0.72%-15.6%1-8
• The ideal gold standard for breakage rates would be 0%
• At a clinical governance meeting we agreed that 6% would be an acceptable standard.

Method
• All bond ups were prospectively looked at in a 6 month period between Aug 2010 and Feb 2011.
• Patients were bonded up alternately using CM and SEP.
• The method was standardised.
• Clinicians of all levels were involved.
• Patient details were documented along with the bonding system into a data sheet on clinic. When patients returned for a breakage appointment a note of the number of brackets failed was documented on the data sheet by circling the relevant tooth / teeth:

Patient details
<table>
<thead>
<tr>
<th>Patient</th>
<th>Clinician</th>
<th>Date</th>
<th>Bonding system used?</th>
<th>Breakage</th>
<th>Circle tooth/ teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>7654321</td>
<td>7654321</td>
<td>7654321</td>
<td>7654321</td>
<td>7654321</td>
<td>7654321</td>
</tr>
</tbody>
</table>

• More training to be given to junior clinicians in different bonding techniques
• Dissemination of findings at Departmental Clinical Audit meeting

Recommendations
• The use of conventional bonding systems is preferable in a teaching environment to avoid high failure rates
• More training is required for junior clinicians in the use of different bonding techniques
• SEP is not cost effective

Conclusion
• While SEP would be cheaper for a full bond up; it is not cost effective for split arches or individual teeth when the high breakage rate is taken into account.

Cost Implications
• Etch (¼ syringe), tip, primer, applicator brush and dappens pot (x1) cost £2.22 for a full bond up.
• SEP costs £1.19 per disposable applicator.
• While SEP would be cheaper for a full bond up; it is not cost effective for split arches or individual teeth when the high breakage rate is taken into account.

Results
• 74 patients bonded up included 36 girls and 38 boys.
• The overall failure rates for the CM and SEP were 5.3% and 13% respectively (table 2, figure 3).
• It was noted that the junior clinicians had higher breakage rates using SEP (table 4).
• There were 3 patients who had breakages of 5 brackets or more using SEP and these patients were all treated by junior registrars.

Method
<table>
<thead>
<tr>
<th>Total number of teeth bonded</th>
<th>Total breakages</th>
<th>% Breakage rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Etch Primer</td>
<td>402</td>
<td>53</td>
</tr>
<tr>
<td>Conventional Method</td>
<td>514</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 2: Results of Breakage rates overall

Figure 3: Results of Breakage rates overall

Acknowledgements
Thank you to Rachel Bradford for her help with this audit.

References
6. orthodontic bracket failure rates when using Orthosol universal bond enhancer compared to a conventional bonding primer. J Orthod 30:37-52