

# Requirements for Oral Surgery Simulator Procurement

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Hardware Requirements	Kobra Oral Surgery Simulator
Dimensions of footprint should be within 1400 x 600 mm for easy placement	<input checked="" type="checkbox"/> Dimension Kobra 2019: Height (average): 1780 mm Width (footprint): 1200 mm Depth (footprint): 490 mm
Should have a 3D haptic feedback device capable of at least 4N continuous force throughout its workspace.	<input checked="" type="checkbox"/> Kobra model 2019 is capable of at least 5N force continuously, plausibly more
Food pedal for control of drill on/off and change of tool	<input checked="" type="checkbox"/> Included
3D Glasses for Stereoscopy	<input checked="" type="checkbox"/> 2 pairs included
Ability for two users to see the 3D simulation simultaneously	<input checked="" type="checkbox"/> Large enough 3D display to accommodate 2 persons
Electrically height adjustable for user comfort and correct positioning of operator.	<input checked="" type="checkbox"/> Height-adjustable stand built in
Have a separate display for tabulated information to keep the main display clutter-free	<input checked="" type="checkbox"/> Separate touch-screen included
Be easily movable with mobility wheels	<input checked="" type="checkbox"/> Wheels optionally mounted

Software Requirements	Kobra Oral Surgery Simulator
<p>An oral surgery simulator should at least allow for simulating the following in each training case:</p> <ul style="list-style-type: none"> <li>● Drilling into bone and teeth.</li> <li>● Haptically distinguish between higher density material (enamel) and lower(dentin)</li> <li>● Register if student drills into forbidden (neighbouring tooth, nerves) or dangerous areas (too near the lingual side). The areas should be specific to each training case.</li> <li>● Constrain the student to carry out the procedure in an order of steps determined by the case creator. For example the right amount of alveolar bone has to be removed in order to continue to divide the tooth.</li> <li>● Total amount of material removed should be recorded to assess that not excessive amount has been removed.</li> <li>● If a case requires the use of an elevator, it's correct positioning and use should be incorporated in the simulation, although physically correct simulation of</li> </ul>	<input checked="" type="checkbox"/> All supported

<p>elevator movement is not necessary.</p> <ul style="list-style-type: none"> <li>• In addition to the interactive bone and teeth, have a visual face model that illustrates the challenge of working in an actual mouth rather than in free space.</li> <li>• Have relevant x-ray projections and anamnesis attached for the student to analyse prior to operation.</li> </ul>	
To allow for assessment by instructor and follow-up training, it should provide a way to store recorded simulation sessions.	<input checked="" type="checkbox"/> Supported when connected to Internet
Provide a way to retrieve recorded simulation sessions over a network on another compatible surgery simulator.	<input checked="" type="checkbox"/> Included

<b>Extensions and support</b>	<b>Kobra Oral Surgery Simulator</b>
Allow for extensions with new simulation cases	<input checked="" type="checkbox"/> Third-party are extensions allowed (requires software engineering)
Allow for modifications of simulation engine	<input checked="" type="checkbox"/> Simulation engine is open source
Updates and support for at least 2 years	<input checked="" type="checkbox"/> 2 years warranty, software updates and online support in English included