S1 - Supporting Information
Detection of External Markers
Supporting info to: Can the fusion of motion capture and 3D medical imaging reduce the extrinsic variability due to marker misplacements?
X. Gasparutto, J. Wegrzyk, K. Rose-Dulcina, D. Hannouche, S. Armand

External Markers Detection

Skin markers with lead beads
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**External Markers Detection**

**Step 1:** Threshold on moving window
- everything below a percentage of max luminosity in the window is set to 0
- Threshold is between 60% and 90%
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External Markers Detection

Step 2: Filters (Matlab functions)
- bwareaopen: remove smallest elements
- imfill: fill image regions and holes
External Markers Detection

Step 3: Identify points
- regionprops: get region properties

- Constraints on ratio Minor/Major axis
  - Ratio should be > 0.8
  - Circle would be 1

- Constraint on minimal size (8px)
**External Markers Detection**

**Step 3: Identify points**
- regionprops: get region properties

- Constraints on ratio **Minor/Major** axis
  - Ratio should be > 0.8
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- Constraint on minimal size (8px)
External Markers Detection

**Step 4:** Points on sagittal view
- Take strip of image at marker height
- Marker detection algorithm
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External Markers Detection

**Step 4:** Points on sagittal view
- Take strip of image at marker height
- Marker detection algorithm

No point on sagittal view
- Point is removed

Filters
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External Markers Detection

Step 4: Points on sagittal view
- Take strip of image at marker height
- Marker detection algorithm

Point on sagittal view
- Point is a marker
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External Markers Detection

**Step 5**: Same but Sagit. to Frontal
- On sagittal: check if point is new
- On frontal: check if point is a marker
- If so save marker
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**External Markers Detection**

**Step 6:** Missing markers?
- Missing marker are identified manually
- Select zone manually
- Detection algorithm on zone

**Step 7:**
- Manual ID of Skin Markers