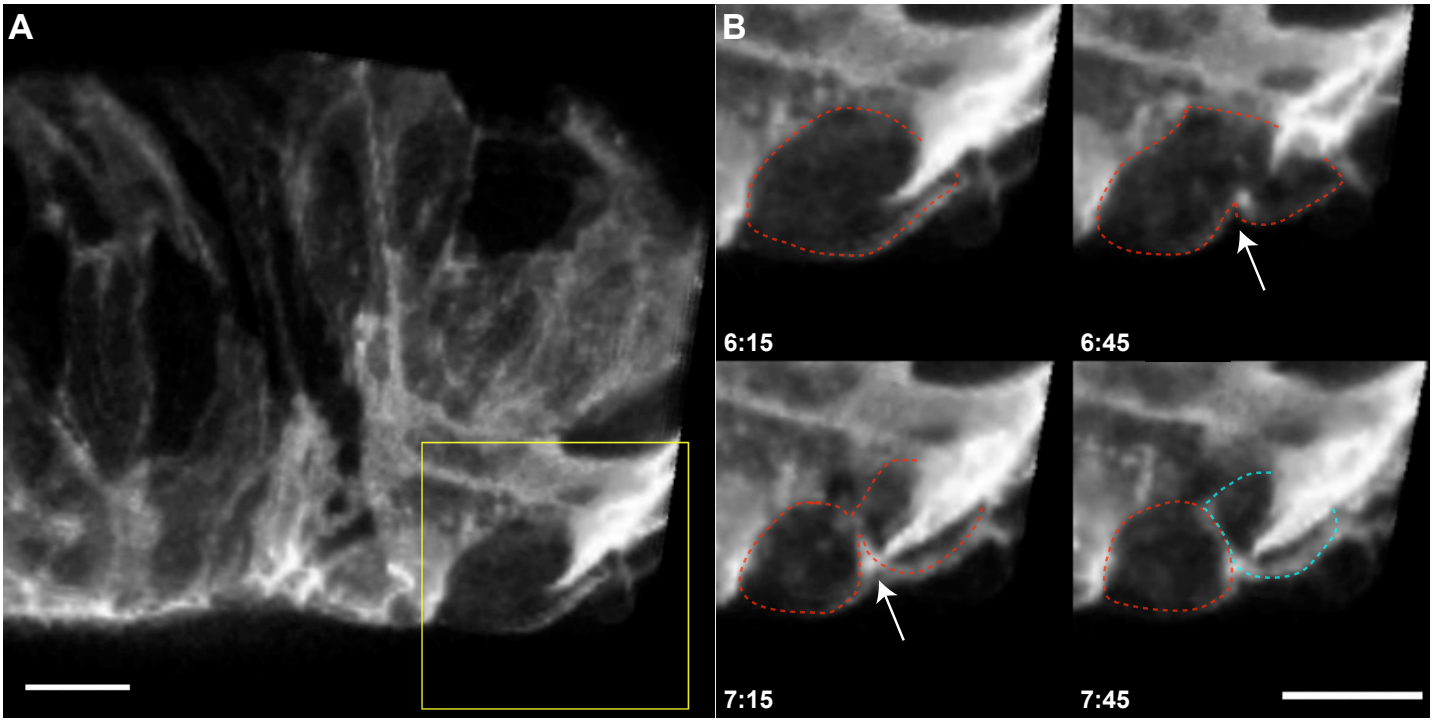


Fig. S1. Visualization of cardiomyocyte division. (A) 3D view of a 78 hpf *Tg(myl7:ras-GFP)* heart. Yellow box marks area of interest in (B). (B) Zoom in on dividing cardiomyocyte. Arrows point to cleavage furrow. Cell membranes are highlighted with dotted lines. By the last panel, the cardiomyocyte has divided, and the membranes of the two daughter cells are highlighted in different colors. Part of the membrane on the right is obscured by an overlying cardiomyocyte. Time into the movie is indicated in hours:minutes. Scale bars, 10µm.

Movie 1. Example of pre- and post-alignment data. The data are the same as those shown in Fig. 1. The left 3 columns show raw movies from each of 3 developmental time points representing one heartbeat. The right 3 columns show the same datasets after post-acquisition alignment. Rows show position in the z-stack in microns from the heart surface. The last row shows a z-projection of each dataset. Note that the z projections of the raw data are uninterpretable, while the aligned datasets can be easily analyzed. Movies were acquired at 60 fps (~16 ms/frame).

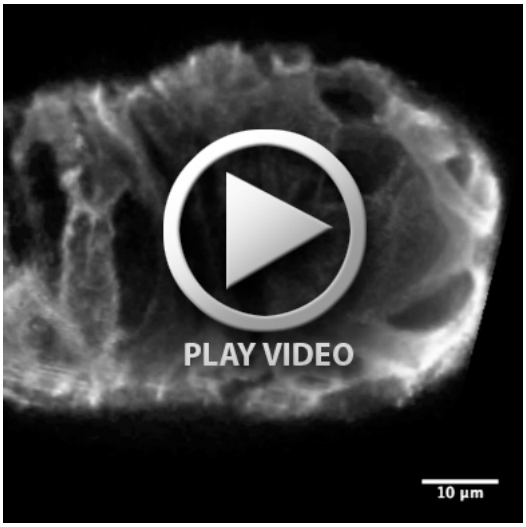
Movie 2. *Tg(myl7:ras-GFP)* heart shown in Fig. 1. Arrows point to locations where protrusions are clearly extending. Arrowheads point to two protrusions extending towards each other, which is shown in more detail in Fig. 1F and supplementary material Movie 4. Frames taken every 30 minutes.

Movie 3. Zoom in of supplementary material Movie 2 focusing on the protrusion shown in Fig. 1E. Arrow points to location of emerging protrusion. Frames taken every 30 minutes.

Movie 4. Zoom in of supplementary material Movie 2 focusing on the two protrusions shown in Fig. 1F. Arrowheads point to the two protrusions that appear to form a cellular contact by the end of the movie. Frames taken every 30 minutes.

Movie 5. 60 hpf *Tg(myl7:ras-GFP)* heart shown in Fig. 4A. Blue, red and cyan cardiomyocytes are marked as in Fig. 4A. The red cardiomyocyte exits the compact layer over the course of the movie, while the blue and cyan cardiomyocytes take up the space it occupied. Frames taken every 30 minutes. Scale bar, 10 μm.

Movie 6. 59 hpf *Tg(myl7:ras-GFP)* heart shown in Fig. 4B,C. Green and purple cardiomyocytes marked as in Fig. 4. The green cardiomyocyte constricts its abluminal surface over the course of the movie, while the purple cardiomyocyte expands to partly take its place. Frames taken every 30 minutes.



Movie 7. 78 hpf *Tg(myl7:ras-GFP)* heart shown in supplementary material Fig. S1. One cardiomyocyte (marked in purple at the beginning) undergoes a cell division (arrow). Frames taken every 15 minutes.