

Supporting Information

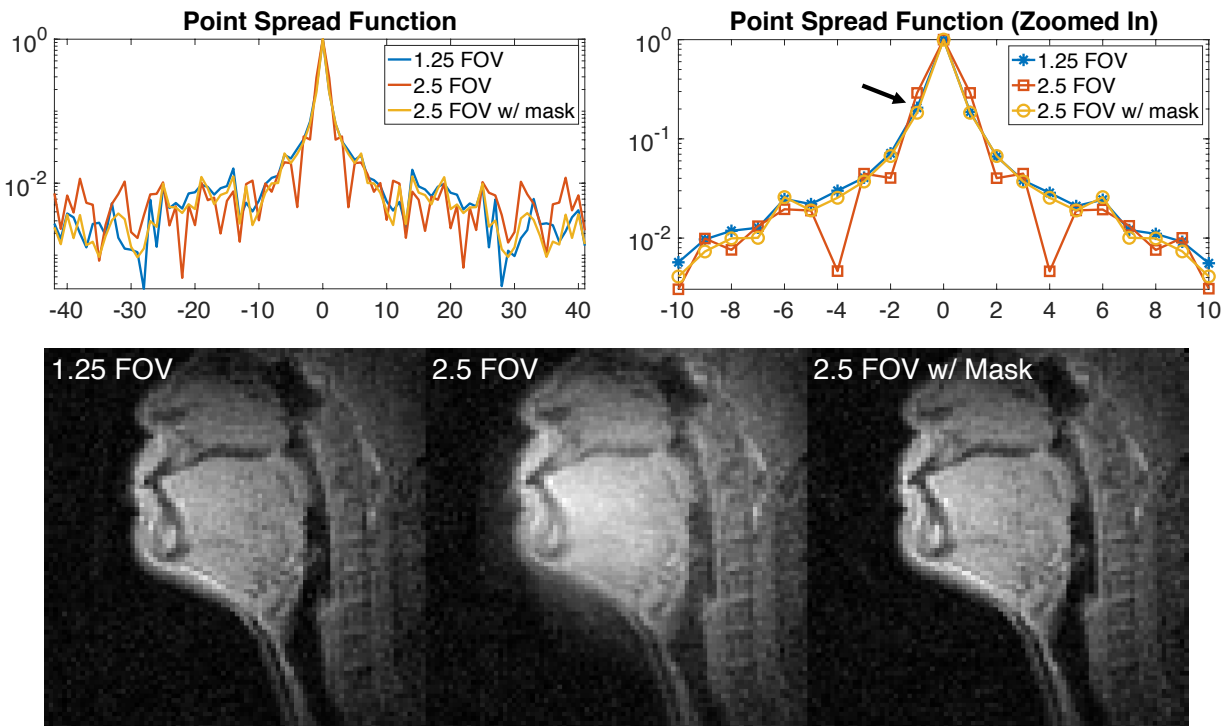


Figure S1. Point spread function analysis for the LF reconstruction. Top row shows PSFs of reconstructions using $1.25\times\text{FOV}$, $2.5\times\text{FOV}$, and $2.5\times\text{FOV}$ with a $\sqrt{2}\times$ circular FOV mask (M_2). Trajectory used to generate these PSFs was a 13-interleaf spiral trajectory supporting an 84×84 matrix size, which is the same trajectory as used for in vivo acquisition in this study. The PSFs of $1.25\times\text{FOV}$ and $2.5\times\text{FOV}$ with mask are similar, although the PSF of $2.5\times\text{FOV}$ is wider, as denoted by a black arrow, causing blurring in the reconstructed image. The bottom row shows a time frame of reconstructions with $1.25\times\text{FOV}$, $2.5\times\text{FOV}$, and $2.5\times\text{FOV}$ with a $\sqrt{2}\times$ circular FOV mask (M_2), where the blurring can be seen on the $2.5\times\text{FOV}$ reconstruction. Note that this example is used to illustrate the impact of M_2 ; thus, we picked a dataset without aliasing artifact and did not use M_1 during reconstruction.

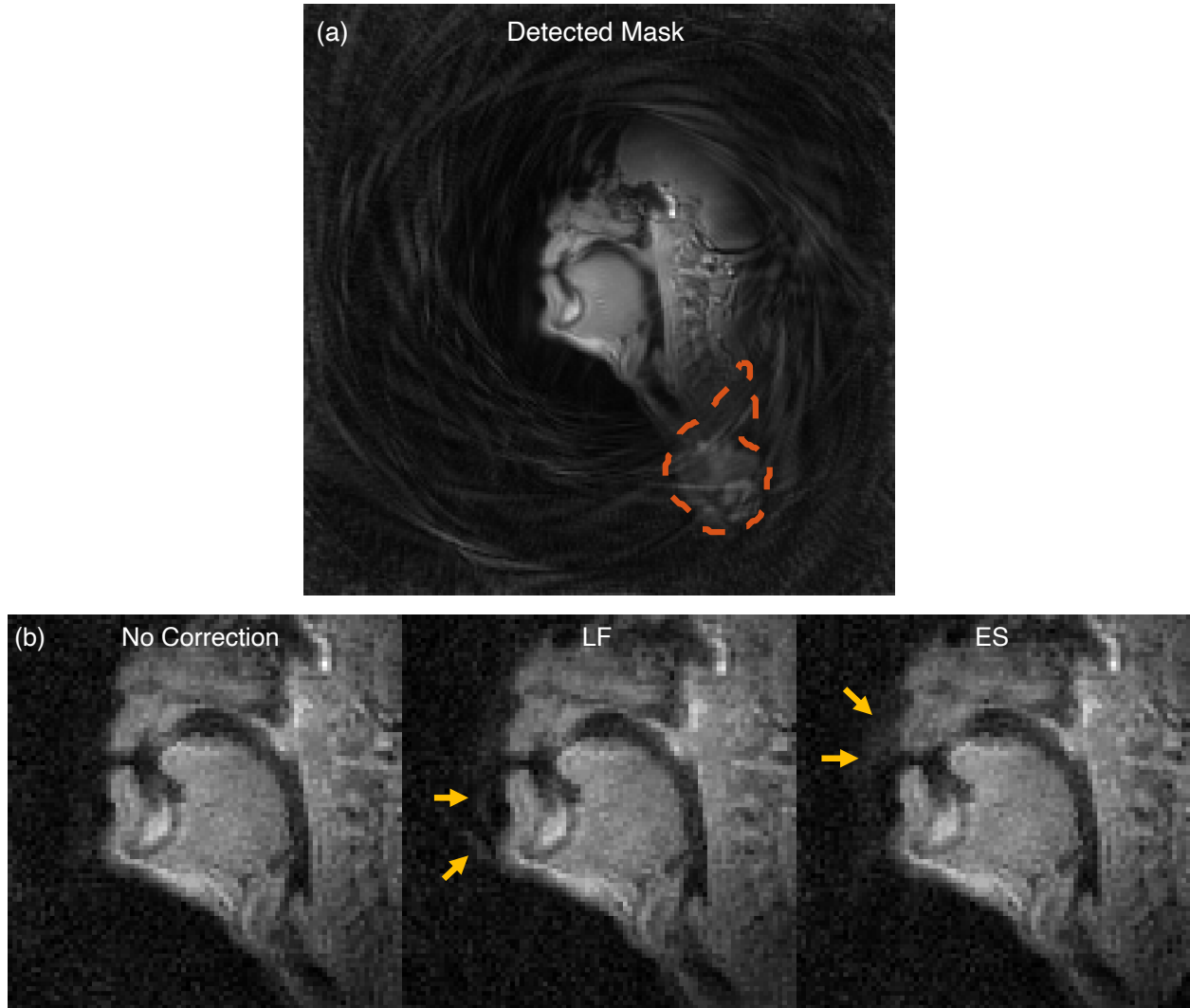


Figure S2. Artifacts caused by an oversized mask in ES and LF reconstructions. This figure shows an example of additional artifact caused by the spiral aliasing reduction methods, in which there was no apparent aliasing artifact before correction. A, The automatic masking was able to identify a hotspot outside the FOV; however, due to its low signal intensity, the mask includes a large area of only aliasing (or signal leakage) from the signal within the FOV. B, When this signal leakage is subtracted from the k-space, as in the ES method, or reconstructed as in the LF method, the signal within the FOV is affected, causing increased artifacts as denoted by yellow arrows. However, only 1 of 58 data sets suffered from additional artifact, and the threshold $r_{\text{out/in}} \leq 0.4$ was able to identify it as an aliasing-free dataset, preventing it from being processed.

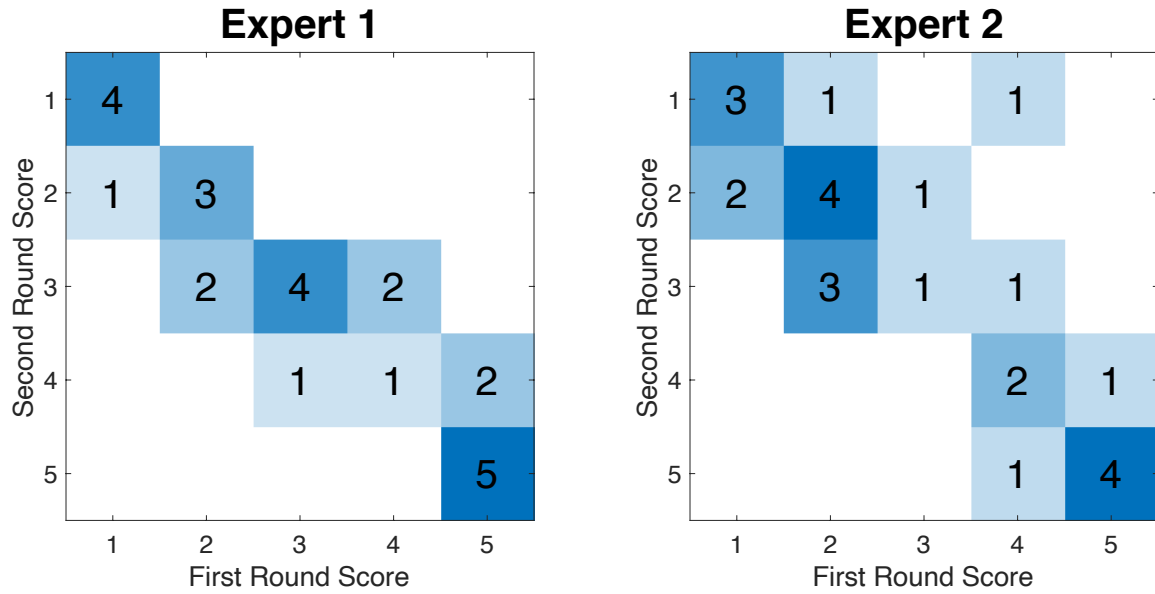


Figure S3. Confusion matrixes of the two-rounds of evaluation. The figure shows confusion matrix data for the two rounds of evaluation in which raters score the no-correction reconstruction videos. The bias is mostly with ± 1 grade, with only one instance having ± 3 deviation.