Sobolev Homeomorphic extension

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Let X and Y be ℓ-connected Jordan domains, $\ell \in \mathbb{N}$, with rectifiable boundaries in the complex plane. We prove that any boundary homeomorphism $\varphi \colon \partial X \to \partial Y$ admits a Sobolev homeomorphic extension $h \colon \overline{X} \to \overline{Y}$ in $W^{1,1}(X, \mathbb{C})$. Our examples show that the assumption of rectifiable boundary cannot be relaxed. We also consider the existence of $W^{1,2}$-homeomorphic extensions subject to a given boundary data.