Chronic total occlusion is defined as complete vessel occlusion with TIMI 0 flow within the occluded segment and an estimated occlusion duration of $\geq 3$ months.

In a consecutive series of patients without previous CABG surgery or recent myocardial infarction, who underwent angiography, totally occluded vessels were observed in 25% of cases.

Patients with CTO underwent PCI less frequently than those without CTO (11% vs. 36%, respectively; $P < 0.0001$) but were more frequently assigned to CABG or medical therapy.
Case 1

Male pt 55 years
Hypertensive – dyslipidemic
Chest pain on effort
Resting ECG : non specific changes
Echo: Grade I diastolic dysfunction
Positive stress test.
Lab. With normal

Coronary angiography

LM normal
LAD : totally occluded in mid segment
Lcx: normal
RCA: dominant, gives retrograde collaterals to LAD
Case 2

Male pt 58 years
HTN – DM
Chest pain on effort
Resting ECG: old inferior MI
Echo: good systolic function
Positive MPI test in the infro-posterior territory.
Lab. With normal
Coronary angiography

LM normal
LAD: mild atherosclerosis, no lesions
Lcx: normal
RCA: dominant, totally occluded takes retrograde collaterals from LAD
PCI to RCA
Treatment of CTOs should be considered in the presence of symptoms or objective evidence of viability/ischaemia in the territory of the occluded artery.

Given the usually high procedural contrast volume, the potential long-term risk of radiation exposure and contrast-induced nephropathy should be considered.
Ad hoc PCI is not recommended for CTOs.

Observational studies suggest that successfully revascularized CTOs confer a long-term survival advantage over failed revascularization.

In addition, better relief of angina and functional status was observed after successful CTO recanalization.

Success rates are strongly dependent on operator skills, experience with specific procedural techniques, and the availability of dedicated equipment (specialized guide wires and catheters or very low profile CTO balloons).

Bilateral angiography and IVUS can be very helpful, as can special techniques such as guide-anchoring, various retrograde approaches, and specific wiring manipulation techniques, including parallel or anchoring wire.
A retrograde approach via collateral pathways offers an additional possibility of success after failure of antegrade crossing, especially for right coronary artery and LAD occlusions.

In general, this technique is not regarded as a first-line approach and is generally reserved for previous failed attempts.

DES provided superior clinical outcome to BMS, mainly due to a lower risk of revascularization.