By means of a technique, which does not employ partial wave (PW) decompositions, the nucleon-deuteron break-up process is evaluated in the Faddeev scheme, where only the leading order term of the amplitude is considered. This technique is then applied to calculate the semi-exclusive proton-deuteron break-up reaction \(d(p, n)pp\) for proton laboratory energies \(E_{lab}\) of a few hundred MeV. A comparison with PW calculations is performed at 197 MeV projectile energy. At the same energy rescattering processes, which are not included in the 3D calculations yet, are shown to be still important in the full Faddeev PW calculations, especially for the cross section and the analyzing power \(A_y\). Next kinematical relativistic effects are investigated for projectile energies up to about 500 MeV. At the higher energies, those relativistic effects start not to be negligible, especially in the peak of the cross section.