Multi-hop forwarding extends wireless coverage and provides inexpensive Internet access. However, due to co-existing intra-path and inter-path interference in wireless networks, multi-hop forwarding significantly degrades network performance (e.g. throughput, reliability and fairness etc.). In response to this challenge, we propose a unique solution, hybrid TDMA/CSMA, as a medium access control method to effectively handle a wide range of complicated interference scenarios under the impact of dynamic traffic. Our simulation results demonstrate that hybrid TDMA/CSMA significantly reduces packet loss rate, and increases throughput as well as fairness.